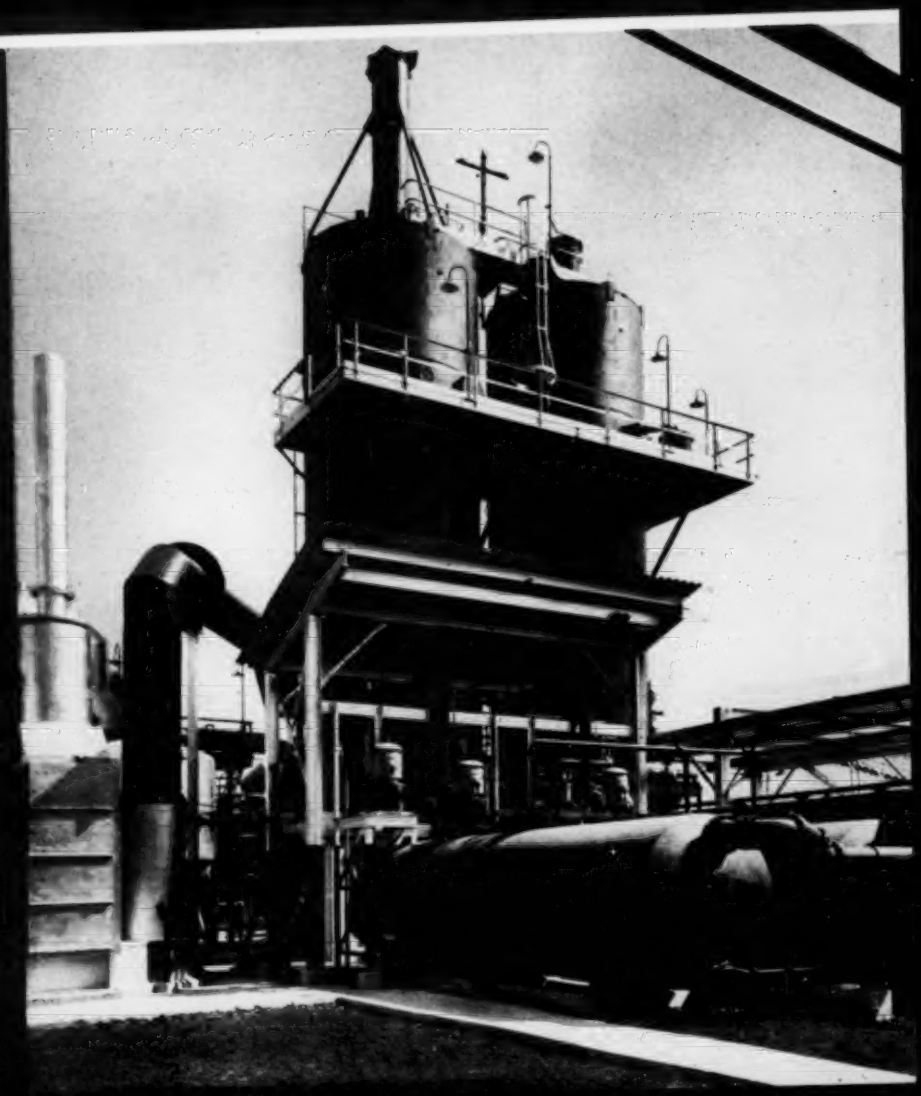
AGRICULTURAL CHEMICALS



killing power

. . . TO CONTROL THE SILENT INVADER

All the peoples of the world seek more crops of food and fibre . . . but insects and soil-sucking weeds work constantly against them.

The weeds, those silent invaders which loot the soil of its nourishment, are beginning again to crowd out vitally-needed crops.

Farmers will be seeking the aid of weed-killers. You can help them with the weed-killing power of POWCO BRAND 2,4-D formulations!

John Powell & Co., Inc.

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THE PRICELESS INGREDIENT

The widely advertised slogan of a great manufacturer of pharmaceutical products proclaims that the priceless ingredient of a product is the reputation of the maker.

The constant aim of P.C.A. is to preserve and improve its reputation with its customers by continuing attention to their needs.

P.C.A. still leads the industry in the production of 60% MURIATE.

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Carlsbad, New Mexico

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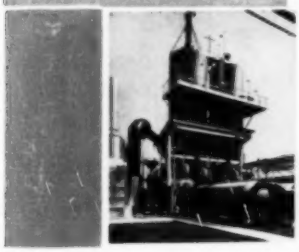
AGRICULTURAL CHEMICALS



THIS MONTH'S COVER

Part of new plant recently completed for Guanos y Fertilizantes S.A., near Mexico City. Output of the entire plant is expected to reach 70,000 tons of low-cost ammonium sulfate per year, for distribution in Mexico.

VOL. VI No. 5
MAY 1951

In This Issue:

AGRICULTURAL CHEMICALS

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A Monthly Magazine For the Trade

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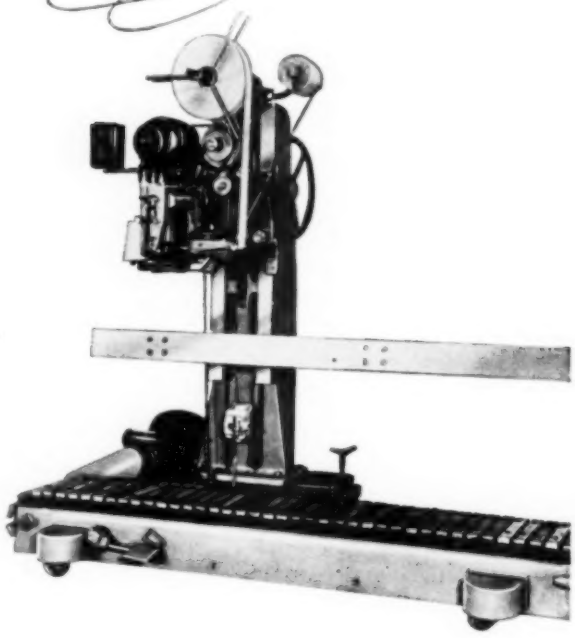
LAWRENCE A. LONG
Editor

THOMAS MORGAN
Advertising Manager

•

THE BAG CLOSER WITH THE "built-in Guardian Angel"



Model ET applies famous "Cushion-Stitch" over dry tape for sift-proof closure. Model E-1 applies "Cushion-Stitch" only, for use where sift-proofing is not essential.

When you buy a Bagpaker®, you get a "guardian angel" as well.

He may not look as angelic as the cherubs on a Christmas Card, but his intentions are just as golden. He's the Bagpak Service Engineer, and his job is to keep your Bagpaker in good shape—happy and well-adjusted so that it can provide the kind of continuous, trouble-free performance it was built to give.

That isn't very hard for a Bagpaker to do, because Bagpak designers have put in *extra strength*—heavy duty working parts—welded steel construction—all improvements that reduce lost time due to breakdowns. The savings on this alone can be tremendous over the years.

The combination of superior design and construction, plus experienced Bagpak service, makes the Bagpaker the kind of machine that brings your bag closing operation "a little closer to heaven."

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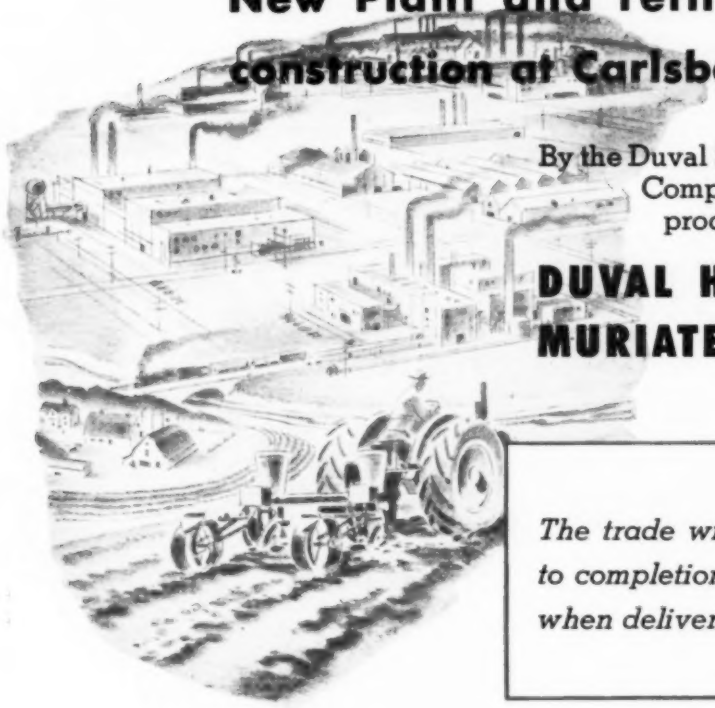
ANNOUNCING!

A NEW SOURCE OF POTASH

New Plant and refinery under construction at Carlsbad, N. Mex.



By the Duval Sulphur and Potash Company for the production of

DUVAL HIGH GRADE MURIATE OF POTASH

The trade will be informed as to completion of the plant and when deliveries will start.

ASHCRAFT-WILKINSON COMPANY HAVE BEEN APPOINTED AS EXCLUSIVE DISTRIBUTORS FOR DUVAL SULPHUR AND POTASH COMPANY

Address All Communications to

ASHCRAFT-WILKINSON CO.

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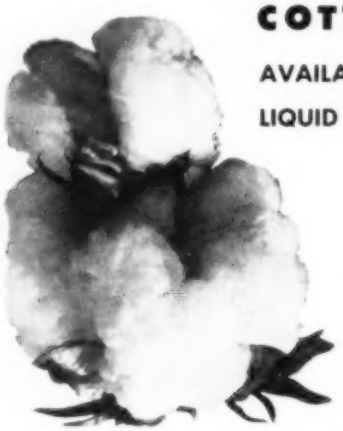
DUVAL POTASH *FOR BETTER PRODUCTS OF FARM AND FACTORY*

153 items you can for your 1951

COTTON POISONS



AVAILABLE IN DUSTS AND LIQUID FORMULATIONS

- 44 Aldrin
- 44 Dieldrin
- 44 Toxaphene
- 44 Benzene Hexachloride
- 44 Chlordane

Formulated in any combinations to suit the recommendations of yourself, your customers and your county agent.

CATTLE SPRAYS

- 44 Gold Star Livestock and Barn Concentrate
- 44 Stock and Barn Insect Killer
- 44 Dairy Spray
- 44 Grub Dust
- 44 Ben-Hex 10
- 44 Sheep Dust

BRUSH KILLERS

- 44 Brush Murder (2,4-D and 2,4,5-T)
- 44 Hi-Strength Brush Murder
- 44 2,4,5-T Concentrate

TOXAPHENE

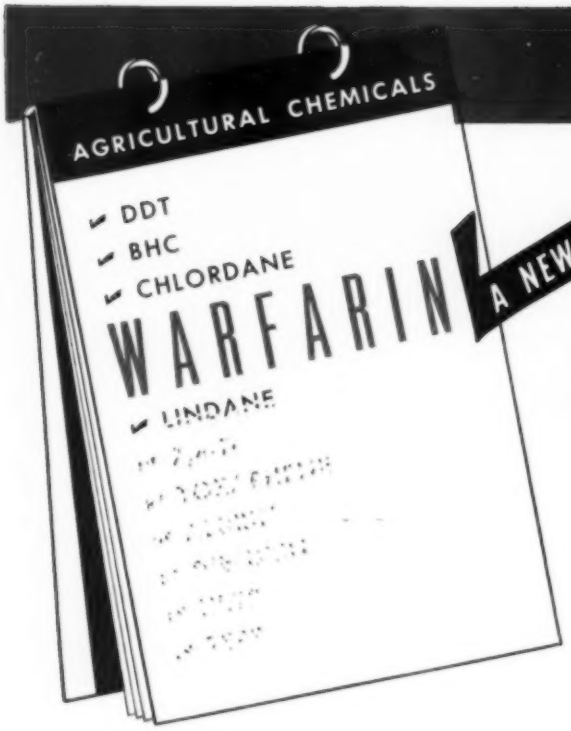
- 44 Emulsifiable Toxaphene Concentrate
- 44 Super Toxaphene Concentrate
- 44 Toxaphene Oil Concentrate
- 44 Cotton Dust 20-40
- 44 10% Toxaphene Dust
- 44 20% Toxaphene Dust
- 44 Wettable Toxaphene Powder

WHEAT CHEMICALS

- 44 2,4-D Weed Killers
- Toxaphene Emulsifiable Concentrates and Dusts
- 44 Chlordane Emulsifiable Concentrates and Dusts
- 44 Parathion Emulsifiable Concentrates and Dusts
- 44 Tepptone Emulsifiable Concentrates and Dusts

CORN INSECTICIDES

- 44 25% DDT Emulsion Concentrate
- 44 DDT Wettable Powder
- 44 Parathion Emulsifiable Concentrate
- 44 Tepptone Emulsifiable Concentrate and Dusts



A NEW AGRICULTURAL CHEMICAL

Warfarin has definitely established itself as an agricultural chemical. This startling new rodenticide is proving its worth to millions of farmers in ridding their premises of rats and mice.

The Warfarin concentrate is available in bulk under the brand name.

DETHMOR

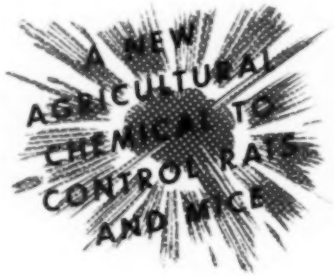
A profitable addition to your line of agricultural chemicals.

Ask the county agents regarding their experience with Warfarin.

Our Warfarin product, Dethmor, is sold in bulk to re-packers for sale under private brands. Most distributors also offer finished (ready-to-use) baits.

NOTE...

For those who prefer to distribute an established small package line—write for our list of re-packers.



* The March issue of Reader's Digest tells the interesting story of Warfarin — millions are reading it.

S. B. PENICK & COMPANY

19 CHURCH STREET, NEW YORK 7, N. Y.
Telephone, COrtlandt 7-1179

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THESE GRANULES PROVIDE CONTROL

Only Davison uses an exclusive finishing process that produces superphosphate in granules. Davco Granulated Superphosphate thus offers you a number of sales points that you can use to make your business grow.

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Davison is a primary producer of superphosphates, mining its own phosphate rock, producing its own acid, scientifically controlling every step of the process. Thus you get quick delivery of the highest quality, either bulk or bagged. Price puts you in a favorable competitive position.

Progress through Chemistry

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Whether you formulate insecticides or use them in the field, questions of residual effectiveness and toxic residues are vitally important. ALDRIN and DIELDRIN possess different degrees of residual effectiveness, but both have the stamina of champions in their respective classes, permitting a choice of insecticides to meet specific needs: ALDRIN for effective short-term killing power; DIELDRIN for extended killing power—up to three months in protected situations.

Because ALDRIN is relatively volatile, has a shorter "residual" than DIELDRIN, it is recommended for use on food and forage crops. Under outdoor conditions, ALDRIN residue can seldom be detected by chemical analysis ten days after application of effective dosages.

DIELDRIN lasts much longer than ALDRIN. Hence, where persistence is desirable and practicable as in public health pest control, control of insects on fiber crops, and control of ants and termites, DIELDRIN is the choice.

Both chemicals have short lethal contact times. They are "on their toes" from the start. Insects need be in contact with ALDRIN or DIELDRIN briefly to pick up a fatal dose of the chemical. After that, although it may take several hours for the pests to die, their ability to do damage or reproduce has been ended.

ALDRIN and DIELDRIN are effective against a wide range of destructive pests which includes grasshoppers, subterranean pests, flies and mosquitoes, plum curculio, alfalfa weevil, boll weevil and several other cotton insects.

ALDRIN *and* DIELDRIN *are effective at extremely low dosages;* therefore, they are among the most economical and most wanted insecticides now available.

We shall be glad to give you more comprehensive information about the subjects touched upon here. Drop us a line *today* and you'll have an answer before you can say "Residuality."

Julius HYMAN & Company

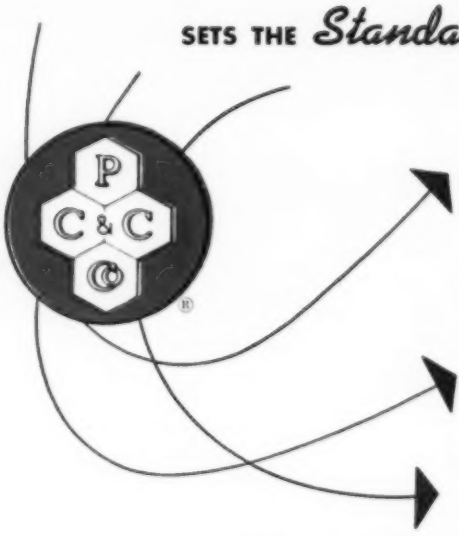
DENVER, COLORADO

Shell Chemical Corporation markets unformulated ALDRIN *and* DIELDRIN *in the United States.*

Pittsburgh METACIDE*

ORGANIC PHOSPHATE INSECTICIDE

SETS THE *Standard for Quality*



EFFECTIVE INSECT CONTROL

FRUITS
Aphids • Grape Berry Moth
Plum Curculio • Lecanium Scale
Red Banded Leaf Roller
European Red Mite

VEGETABLES
Mexican Bean Beetle • Army Worm
Cabbage Worm • Diamondback Moth

FORAGE CROPS
Greenbug • Army Worm
Grasshopper

Strength equal to Parathion!

WRITE FOR METACIDE BULLETIN 109

PITTSBURGH AGRICULTURAL CHEMICAL COMPANY

6505 Empire State Building, 350 Fifth Avenue, New York, N. Y.

DIVISION OF

PITTSBURGH COKE & CHEMICAL CO.

GRANT BUILDING, PITTSBURGH 19, PA.

* METACIDE is a trade mark of Chemagro Corporation, New York, N.Y.

OTHER PITTSBURGH AGRICULTURAL CHEMICALS

ORGANIC INSECTICIDES: Benzene Hexachloride, Toxaphene, Dichloro Diphenyl Trichloroethane, Aldrin, Dieldrin, Chlordane, Dinitro Ortho Cresol; ORGANIC PHOSPHATE INSECTICIDES: Parathion Wettable Powders, Parathion Liquid Concentrate, Metacide; WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, 2,4-D Sodium Salt Monohydrate, Rodenticides, Fungicides, Seed Disinfectants, Cotton Sprays and Dusts and other special Agricultural Chemicals.

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we explore all the corners...

We explore every corner of the earth to supply raw materials to manufacturers of fertilizers, feeds, chemicals, and pharmaceuticals. If you have a supply problem, write, wire or phone us today.

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Orchard Protection By Dusting

SAVES TIME • SAVES MONEY • SAVES CROPS

FASTER For faster coverage, leading fruit growers prefer Niagara dusters and liqui-dusters for high speed orchard protection. There is no faster method of orchard protection than by dusting.

SAVES LABOR Time saved is labor saved. Up to 50 acres of mature apple trees can be dusted in 5 hours with the powerful, one-man operated Niagara Super Cyclone Liqui-Duster.

MORE TIMELY Better growers everywhere use Niagara dusters for apple scab control in the period when timeliness is essential and when orchards are frequently impassable to heavy spray equipment.

DUSTS ARE EFFECTIVE Modern dust formulations provide efficient orchard insect and fungus disease control. Every year an increasing number of growers rely on dusts for most of their protection program.

BETTER FOLIAGE A well-directed dust program with the emphasis on the selection of the proper dust formulations will result in large, healthy foliage and finer fruit finish.

COSTS LESS Niagara dusters cost less to own. They have a long, useful life; are simple and economical to maintain.

Remember—you can dust or liqui-dust, rain or shine, with Niagara dusters and Niagara dust formulations. Write for more information or literature.

Niagara **CHEMICAL DIVISION**

FOOD MACHINERY AND CHEMICAL CORPORATION

MIDDLEPORT, N. Y. • Richmond, Calif. • Jacksonville, Fla. • Tampa, Fla. • Pompano, Fla. • New Orleans, La. • Greenville, Miss. • Harlingen, Tex. • *Canadian Associate:* NIAGARA BRAND SPRAY CO., LTD., Burlington, Ontario

WHEN YOU BUY Niagara YOU BUY PROTECTION

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—he used a fertilizer containing International Potash

Farmers don't *really* expect to get results like this. But they do find that the application of generous quantities of high-grade plant foods is a mighty big factor in producing large acre yields of finer quality grain.

To give their farm customers better plant foods for the production of a variety of crops, more and more fertilizer manufacturers are using *International Potash*. And, to meet the needs of magnesium-deficient soils, they are supplying this essential mineral, in the most practical and economical way, by including *Sul-Po-Mag* in their fertilizer mixtures. Produced exclusively by *International*, *Sul-Po-Mag* is a properly balanced, natural combination of potash and magnesium in water-soluble form.

International Potash and *Sul-Po-Mag* are mined and refined at Carlsbad, New Mexico. They are shipped to you in the excellent mechanical condition that assures efficient, economical mixing in your plant, and easy distribution in the farmer's field.

SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH • SULFATE OF POTASH

Sul-Po-Mag ®
Water-Soluble
Double Sulfate of Potash-Magnesia

INTERNATIONAL POTASH

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STURTEVANT
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Records prove that Sturtevant Air Separators cut separation costs of various materials by as much as 300%. In addition, they provide additional economies by reducing power costs up to 50%. That's why you'll find hundreds of these efficient separators in all types of industries.

Ruggedly constructed of quality materials, Sturtevant Air Separators keep on working day after day with minimum maintenance. They are available in many sizes from ¼ to 50 tons per hour output.

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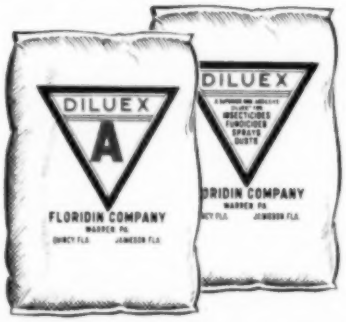
Ask for Samples and Additional Data



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Adsorbents . . . . Desiccants . . . . Diluents

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IMPORTANT ANGLE ON FARM PROFITS

Plants are not the only things on a farm that depend upon good roots!

So, whether it's pigs or plants you're interested in, good, healthy roots will go a long way toward building profits for you. And one of the surest ways of making certain of having good, healthy roots on *your* farm is through the wise use of the right types of fertilizers.

Many of the most effective of these fertilizers contain potash—often Sunshine State Potash, a product of New Mexico. For potash is not only a soil nutrient, it is a crop strengthener as well, helping to resist disease and drought. Through its considered use, any farmer may be assured of increased crop output, and superior condition at time of harvest.

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HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
50% K_2O MIN.
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APPLE
Aphids
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Codling moth
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Grasshoppers
Leaf rollers
Mealybug
Mites
Plum curculio
Red bug
San Jose scale
Scurfy scale
Tortrix

PRUNE & PLUM
Aphids
Bud moth
Leafhoppers
Leaf roller
Mealy plum louse
Mites
Plum curculio
Tortrix

CHERRY
Aphids
Bud moth
Cankerworm
Cherry fruitworm
Mites
Oriental fruit moth
Plum curculio
Tortrix

STRAWBERRY
Aphids
Leaf roller
Red spider mite

PEACH
Cat-facing insects
Cottony peach scale
Fruit tree leaf roller
Mites
Oriental fruit moth
Peach tree borer
Plum curculio
San Jose scale

PEAR
Codling moth
Mealybug
Mites
Pear psylla
Woolly apple aphid

APRICOT
Aphids
Bud moth
Codling moth
Leaf roller
Mites
Oriental fruit moth
Tortrix

CABBAGE, BROCCOLI, BRUSSELS SPROUTS, KALE, MUSTARD, TURNIP, Etc.
Aphids
Armyworms
Cabbageworms
Thrips

EGGPLANT
Aphids
Leaf miner

SPINACH
Aphids

ONION
Thrips

CELERY
Aphids
Celeryworms

CUCUMBER, SQUASH & MELONS
Aphids
Cucumber beetle
Melonworm
Pickleworm
Serpentine leaf miner

PEA
Aphids

PEPPER
Aphids
Serpentine leaf miner

GRAPE
Leaf folder
Mealybug
Mites

BLUEBERRY
Maggot
Thrips

WALNUT
Aphids
Codling moth
Red spider

BEANS
Aphids
Armyworms
Leafhopper
Leaf miner
Leaf roller
Mexican bean beetle
Red spider mites

POTATO & TOMATO
Aphids
Colorado potato beetle
Flea beetle
Grasshoppers
Leafhopper
Serpentine leaf miner
Whitefly

CORN
Armyworms
European corn borer
Grasshoppers

BEET
Aphids
Webworm

CARROT
Aphids

ARTICHOKE
Aphids
Plume moth

OKRA
Aphids

LEGUMES
Aphids
Armyworms
Blister beetle
Grasshoppers

ORNAMENTALS
Aphids
Leafhoppers
Mealybugs
Scales
Spider mites
Whiteflies

PINEAPPLE
Mealybug

CITRUS
Black scale
California red scale
Citricola scale
Cottony-cushion scale
Florida red scale
Mealybugs
Purple scale
Snow scale
Thrips
Yellow scale

SMALL GRAINS
Greenbug

PEANUT
Velvetbean caterpillar

SUGARBEET
Aphids
Webworm

HOPS
Aphids
Red spider

TOBACCO
Aphids
Green June beetle grubs
Midge
Suckfly

OLIVE
Black scale
Oleander scale
Parlatoria scale

COTTON
Aphids
Fleahopper
Red spider mites
Webworm

FULTON MULTIWALLS

must be good*

*must be good ... because of the ever increasing number of users favoring us with larger and larger orders for Fulton Multiwall Paper Bags.

*must be good ... because constant vigilance and inspection insure good workmanship, and uniform high quality which have won many new friends, and are winning more. In any size — all types, pasted or sewn bottom, open mouth or valve — Fulton makes "YOUR STYLE MULTIWALL." Call on Fulton for your next order of Multiwalls.

Fulton BAG & COTTON MILLS

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MORE STATES RECOMMEND PARATHION

More and more state agriculture departments are recommending parathion as an insecticidal chemical. Among them: Texas, for cotton; Wisconsin, for vegetables, corn and alfalfa; New York, for fruits and vegetables; Georgia, for cotton.

Niran, Monsanto's parathion (Diethyl p-nitrophenyl thionophosphate) is one of the most effective insecticidal chemicals known for controlling aphids, mites, caterpillars, beetles and scales. It is a contact, stomach and vapor poison, with high toxicity. Monsanto Niran is used in orchards, citrus groves, greenhouses, truck gardens, forage-crop fields and small-grain fields.

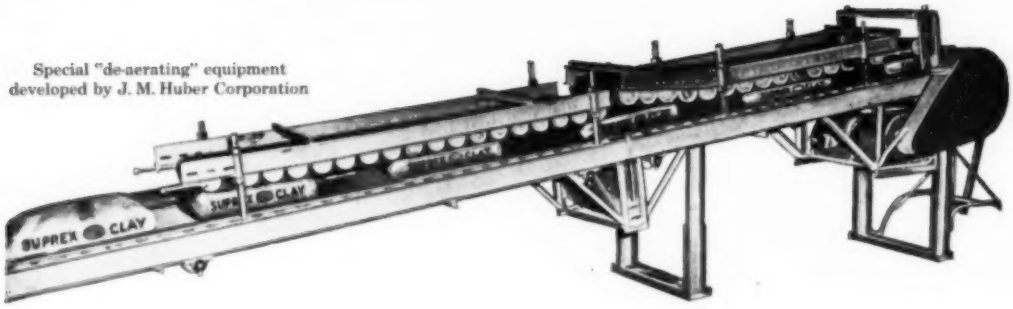
Niran can be handled safely with proper precautions, but, like electricity, improperly used it can be dangerous. For easy-to-follow safety methods and information on formulating and applying Monsanto Niran, write for Technical Bulletin No. O-52, "*Niran*." For information on availability, get in touch with the Monsanto Sales Office nearest you or write to MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second St., St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

Niran: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND



Special "de-aerating" equipment developed by J. M. Huber Corporation

More Space, Less AIR with Huber "De-Aerated" Clay

3000 lbs....ordinary bags 3000 lbs....Huber "de-aerated" bags

Every bag of Huber clay is flattened between roller belts to drive out excess air. Plump, rounded ordinary bags are fed in at one end—flat, compressed, "de-aerated" bags come off the belt at the other end.

"De-aerated" bags are smaller, more compact for neater stacking and easier handling. "De-aerating" also gives a better seal by tightly closing bag valves. Weak bags are rejected... they *pop* as pressure is applied.

"De-aerating" does not alter the characteristics of Huber clays in any way. It simply saves 20% storage space—*12 cubic feet per ton.*

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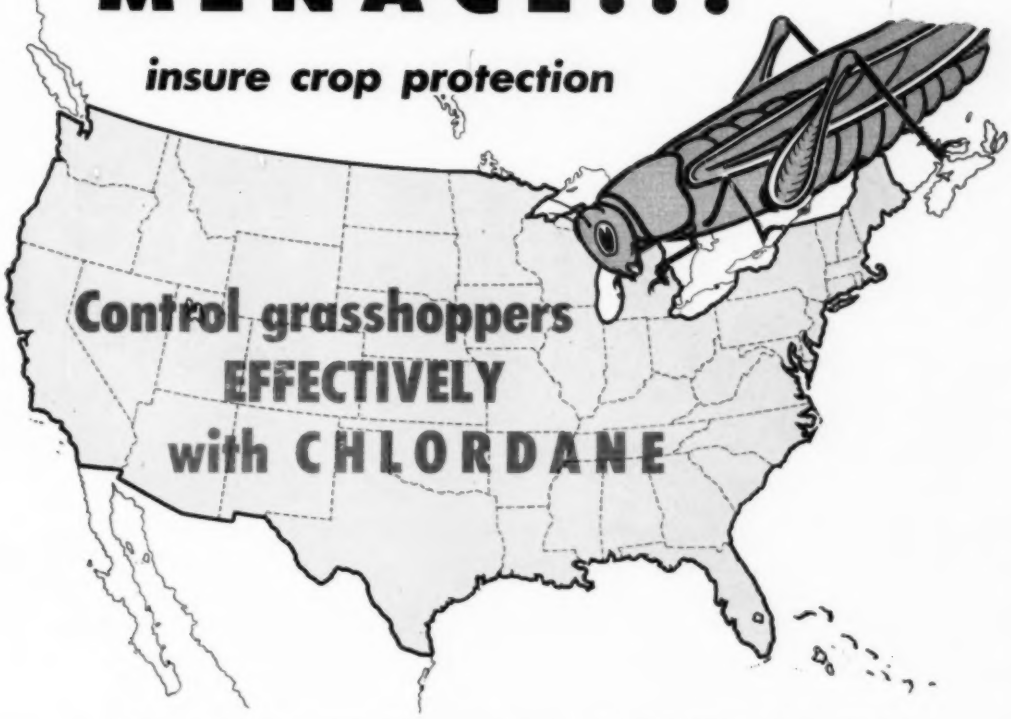
insure crop protection



Again this year government entomologists predict a heavy infestation of grasshoppers. And again chlordane based insecticides provide effective control in preventing serious grasshopper infestations.

Early applications of chlordane formulations prove most effective while the young grasshoppers are concentrated in hatching areas. Proper applications of chlordane along field margins, roadsides and fence rows provides excellent control . . . prevents migration . . . assures the farmer of maximum protection . . . thereby saving him from ruinous crop loss.

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Lion Anhydrous Ammonia—Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia—This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions—Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer—The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

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Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking.

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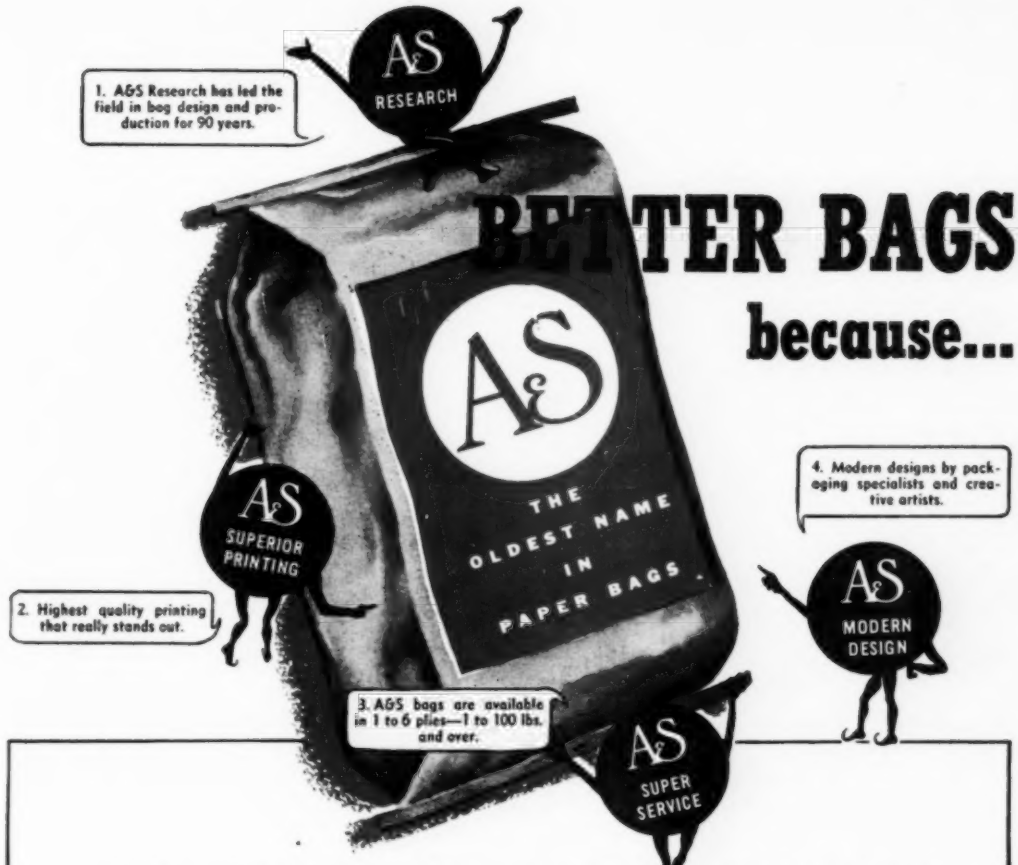

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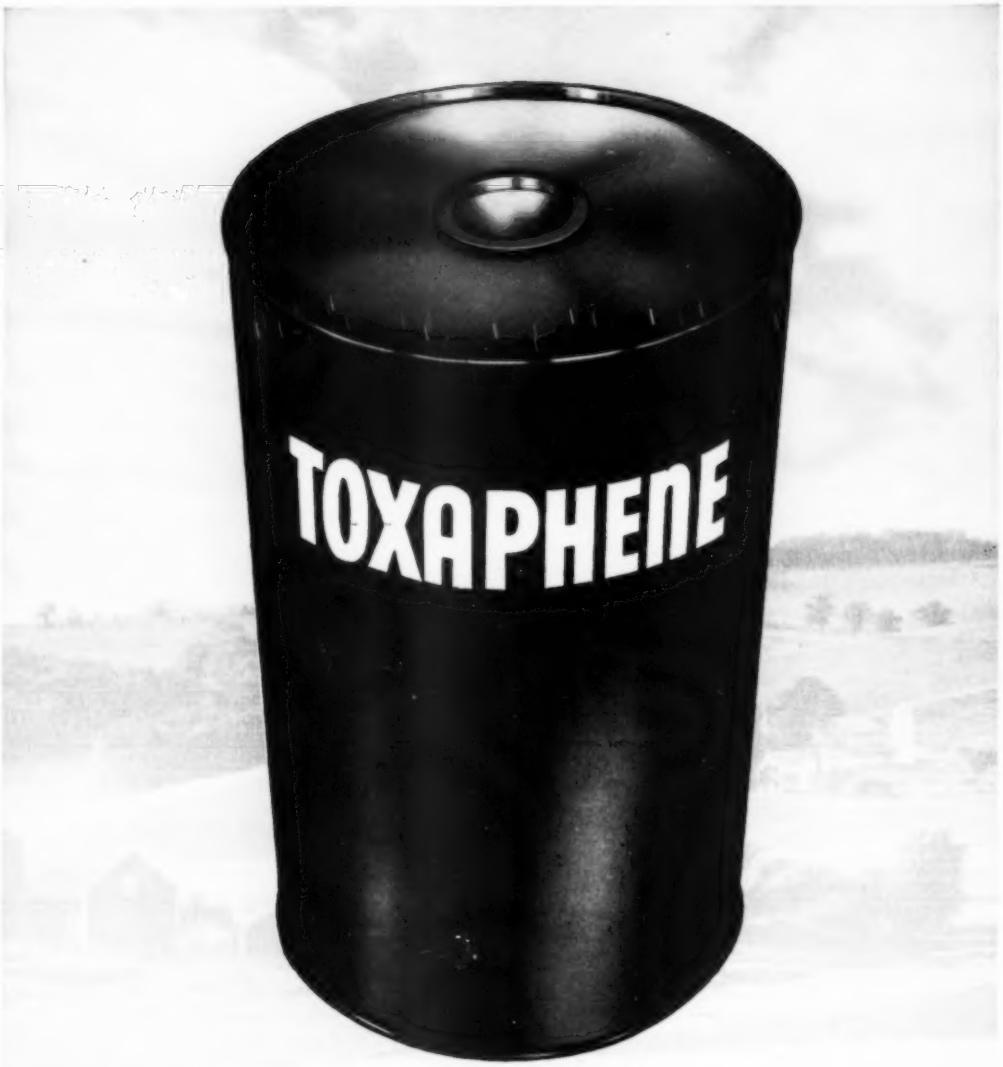

THE EDITOR COMMENTS

AS the Delaney Committee hearings resumed a few weeks ago, and the first representatives of the U. S. Department of Agriculture were finally called upon to testify, a little more light was cast on the question of the toxicity of DDT. The testimony of Drs. Paul Neal and Wayland J. Hayes cut much of the ground out from under Dr. M. S. Biskind, New York physician, who in his appearance a few months ago, had given the impression that a substantial part of the population of the country is suffering from chronic DDT poisoning. Dr. Biskind found DDT responsible for heart disease, skin sensitivity, liver ailments, anemia, etc. and according to his findings about a third of his patients were suffering from the effects of exposure to DDT. Oddly enough no other responsible medical men or research workers have confirmed his findings.

Dr. Neal and Hayes suggest "psychoneurosis" as the answer and emphasize that in all other test work reported, subjects received doses of DDT a thousand times larger than those Biskind's patients were ostensibly exposed to, without any unfavorable symptoms. Dr. Biskind's findings, they remind too, were based on only a single British report, which was not confirmed by further or more thorough experimentation.

While they debunk the Biskind "testimony", the USDA researchers do not attempt to minimize the hazards connected with DDT. They point out that where massive doses are taken accidentally, the acute toxicity hazard is great. They repeat testimony showing the build up of DDT in the body fat and milk of human beings following continued exposure. They deny very definitely, however, that there have been any authentic reports of "liver injury or other chronic poisoning in man resulting from DDT".

When Biskind's original "findings" were announced in the newspapers with front-page screaming headlines, giving the doctor much publicity,—and insecticides, incidentally, a very bad press, they were widely read and discussed. The refutation of the Biskind testimony we hazard a guess, on the other hand, will not be played up in the same fashion. The insecticide industry will be fortunate if it ever rates minor mention in the papers.

AN encouraging indication of Washington's attitude toward pesticides is noted in the recent special directive to manufacturers of metal containers, to provide the insecticide industry with quantities of 55 gallon drums and 5 gallon pails. In addition to the tight situation certain on raw materials for agricultural chemicals, the industry was also facing an acute problem of how to ship the goods. A shortage of containers and means of transportation can be as serious as a lack of raw materials, so far as getting the needed material to its destination is concerned.

The NPA along with the Office of Materials and Facilities of the U.S.D.A.'s Production and Marketing Administration has done a good job of helping to ease a difficult problem. That recognition is given to the importance of the agricultural chemical trade is gratifying, and, we hope, indicative of continued consideration.

It goes without saying however, that the trade must do its part, too. Each person receiving steel containers now must certify that they are "for shipment in liquid form of pesticides usually used for crop protection", and that the new containers will not be building up an excessive inventory of drums and pails. This seems like a fair requirement, and the trade should have no difficulty in keeping well within its provisions.

TWO important meetings of interest to the fertilizer trade and its suppliers are scheduled for June. These, of course, are the 26th annual convention of the National Fertilizer Association and the sixth annual meeting of the American Plant Food Council, as described herein. We look forward to meeting you there!

Fertilizer Raw Materials a MUST for ample food, fiber

by

Dr. Russell Coleman

President, National Fertilizer Association
Washington, D. C.

THE confusion generally associated with the Nation's capital has been aggravated by the present emergency. The usual perplexities caused by new government agencies, new appointments and contradictory orders have been accentuated by the renewed struggle for power among economic groups. As a result, each is accused as never before of attempting to take advantage of the American people.

The so-called farm bloc, for instance, is charged with victimizing the consumer. Questions arise in his mind: How sound are parity prices, farm loans, subsidies and the like? Isn't the farmer a privileged character?

Similar questions develop about other groups. But farmers are in a unique position. Although they include 5.4 million operators, the largest single economic unit, farmers cannot achieve their demands through the familiar weapon of strikes, for their goods are sold well after their investments in land, seed and machinery have been made and before they know what their returns will be. Because farmers' failure to produce can mean a hungry nation, it is essential that their problems be understood by the American people.

With the proclamation by the President of a state of national emergency, farmers were called upon to produce unprecedented quantities of crops and the crop quotas and allotments which had so long been identified with agriculture were quickly thrown overboard. The cry was: "Full steam ahead!"

Farmers have always been willing and eager to respond to challenges of this kind, if, like any other workmen, they have the machinery, the tools and supplies with which to do the job. One of the most vital needs for successful modern agriculture is adequate amounts of chemical fertilizer. For has not the U.S. Department of Agriculture itself stated that fertilizers account for at least 25 percent of all the food, feed and fiber grown on our soils?

So one of the questions facing farmers is whether there would be enough fertilizers to meet demands. The century-old industry has had a remarkable record. The year 1949 marked the eleventh annual period during which production records were topped, one after the other.

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Toxicity Hazards

By
Stanley F. Bailey and Leslie M. Smith*

Part I

Dangers in handling and using agricultural pesticides viewed in a practical light by experts

THE practical handling and application of agricultural chemicals on the farm present certain dangers which must be kept constantly in mind. The factors to be considered are that: (1) the chemicals may injure the plants, (2) the chemicals may injure the applicator or consumer of the crop, and (3) the grower may violate government regulations through ignorance of the laws governing the use of agricultural chemicals.

The question as to whether or not a certain chemical will injure a certain plant under a specific set of conditions can be determined only by trial. The tendency of chemicals to injure plants, (called the phytotoxicity of the chemical), is determined by many factors, some of which are:

1. The nature of the chemical
2. The nature of additives used with it, such as solvents, wetting, spreading, or sticking agents.
3. The species and the variety of the plant treated
4. The age of the plant
5. The season of the year and the consequent condition of the plants.
6. The method of application of the chemical
7. The concentration of the chemical in the mixture applied
8. The amount applied
9. The air temperature during and after application
10. Atmospheric humidity and dew point
11. Accumulation of poisons in the soil.

The nature of the chemical is inherent in the molecule. Some chemicals are called "active" if they tend to react with the living tissues of the plant, thereby causing the death of plant parts. Other chemicals are called "inert" if they do not do so. Chemicals such as lime-sulfur and sodium fluosilicate are apt to produce chemical injury or "burn" when applied to foliage. Others, such as Bordeaux, highly refined oils, and DDT are relatively safe on foliage. Solvents used in the formulation of a chemical may be toxic to plant foliage or may increase the inherent toxicity of the compound. Similarly, wetting and spreading agents may cause penetration of the chemical into vital, susceptible plant parts such as buds, or cause the chemical to penetrate into the breathing pores of the leaves or bark.

Some species of plants are particularly susceptible to chemical injury, whereas other species show the ability to tolerate moderate amounts of many chemicals. Plant tolerance is the factor which determines the maximum concentration of chemical which may be applied safely under various conditions. Often, a whole botanical family of plants will show a uniform tolerance for a certain chemical, but exceptions to this are too numerous to warrant its use as a rule of thumb. In fact, several cases are now known wherein a single horticultural variety is highly susceptible to injury under conditions easily tolerated by other varieties and related species. Thus, for example, olives may be freed from scale insect pests by fumigating with hydrogen cyanide, but this method cannot be used on the Mission variety, because the trees will be injured.

Consequently, a grower who is about to use a chemical which is new to him should make careful inquiries about the tolerance of his particular crop for this chemical. Usually, the representative of the manufacturer can supply the needed information. The grower may also obtain such information from his County Agent or Farm Adviser.

Age of the plants is an important factor in determining plant tolerance. In general, plants are most susceptible to injury in the seedling stage. Young, vigorously growing shoots and leaves are usually more susceptible to injury than mature shoots and leaves. Consequently, the plant can tolerate less chemical in the spring growth period than in the summer or fall. During the winter, dormant, leafless, perennial plants can tolerate far greater quantities of chemicals than they can when in leaf. The labels on packages of agricultural chemicals are usually very explicit on the time of year for application. Any deviation from the proper season may result in serious injury to the plants.

The method of application of the chemical may determine the tolerance shown by the plant. A chemical may be applied as a spray or a dust to the aerial parts of the plant, or may be applied as a gaseous fumi-

***Hazards in the application of agricultural chemicals are the topic for an important chapter in the new book, "Handbook of Agricultural Pest Control", by Stanley F. Bailey and Leslie M. Smith, of the Department of Entomology, University of California. This new handbook, designed for use in the field by the custom spray operator, farm advisor, agricultural chemical salesman, and pest control operator, is now on the press and copies will be available shortly through AGRICULTURAL CHEMICALS. The authors' warnings on toxicity hazards are reprinted here because the subject matter is of such definite and timely importance, particularly in view of the current emphasis on toxicity hazards, residue tolerances, and high degree of safety demanded in application of pesticides.**

gant under tents, etc., or may be applied to the soil, tilled in or added to the irrigation water. In each case, the tolerance of the plant will be varied and perhaps unpredictable. In general, dusts are less apt to produce injury than are sprays, and fumigants are the most apt to be damaging. Excessive pressures on hydraulic rigs may cause harmful penetration into buds or bark. To some extent, the reduction of droplet size, as in aerosols, permits the safe use of more concentrated spray mixtures than could be applied with full dilution, hydraulic rigs.

Regulation of the concentration of the chemical is the chief means by which the grower or applicator is able to avoid the various hazards of plant injury. He must adjust the concentration of the chemical to meet variations in plant species, varieties, temperature, season of the year, age of plants, etc. Any chemical, regardless of how toxic it may be to plants, can be diluted to the point where it can be applied with safety. However, the dilution must not be carried to the point that the chemical is too weak to do the desired job of pest control. Here, again, the grower or applicator, confronted with the use of a chemical new to him, should seek expert advice on the correct concentration to use under the local existing circumstances. Various commercial formulations of the same agricultural chemical may contain different amounts of the active ingredient, the amount being stated on the label. The recommendation for dilution to the concentration intended for application is based on the concentration of active ingredient stated on the label. For example the recommendation for a 50 per cent DDT wettable powder may be two pounds of the whole formulation per 100 gallons of water; a comparable recommendation for a 25 per cent formulation would be four pounds per 100 gallons.

The content of active ingredient in a commercial package is stated as per cent of technically pure chemical. Thus, a 50 per cent DDT wettable spray powder contains 50 per cent by weight of technical grade DDT. Concentrations for use, stated on the label, are usually in pounds or ounces per 100 gallons of water if the formulation is a solid or powder; or quarts or gallons per 100 gallons if the formulation is a liquid. Occasionally, a dosage is expressed as per cent, and in this case the operator should bear in mind that percentage must be based on *weight* of active ingredient and *weight* of finished mixture; or *volume* of active ingredient and *volume* of finished

TABLE 1

Poisonous Action of Agricultural Chemicals

Chemical	Dangerous to Man			Poisonous Residue Left on Crops
	By Mouth	Inhalation	Skin Absorption	
Arsenate of lead	yes	yes	slight	yes
Aldrin	yes	yes	yes	yes
Benzene hexachloride	yes	slight	yes	yes
Chlordane, tech.	yes	yes	yes	yes
Calcium arsenate	yes	slight	slight	yes
DDD	yes	slight	slight	yes
DDT	yes	slight	slight	yes
Dieldrin	yes	yes	yes	yes
Dinitro compounds	yes	yes	yes	no
Dithiocarbamate compounds	yes	no	no	no
Methoxychlor	yes	slight	no	yes
Mercury compounds	yes	yes	no	yes
Nicotine alkaloid	yes	yes	yes	no
Nicotine sulfate	yes	slight	yes	no
Oil, coal tar	yes	no	yes	no
Oil, petroleum*	yes	no	no	no
Paradichlorobenzene	yes	slight	no	no
Parathion	yes	yes	yes	yes
Pentachlorophenol	yes	yes	yes	yes
Pyrethrins	yes	no	no	no
Quinones	yes	no	no	no
Rotenone	yes	slight	no	no
Sulfur	no	no	no	no
Lime-sulfur	yes	no	yes	no
Toxaphene	yes	yes	yes	yes
Tetraethyl pyrophosphate	yes	yes	yes	no
Zinc compounds	yes	—	no	yes

* These values apply only to the heavier petroleum fractions. The light fractions, such as kerosene, used as solvents have a definite toxicity to man and animals.

TABLE 2

Canister and Gas Mask Data

Color of Canister	Protection Afforded	Contents of canister
White	Against low concentrations (less than 2% in air) of acid gases such as hydrocyanic acid and sulfur dioxide	Soda lime, caustic pumice or caustite which is a sodium hydroxide preparation, activated charcoal
Black	Against low concentrations (less than about 2% in air) of organic vapors such as: carbon disulfide, methyl bromide, carbon tetrachloride, ethylene dichloride, chloropicrin, ethylene oxide	Activated charcoal
Yellow	Against low concentrations (less than 2% in air) of a combination of organic vapors and acid gases such as a combination of hydrocyanic acid and chloropicrin	Activated charcoal and soda lime or other alkaline granule
Red	Against low concentrations of combinations of preceding gases; the all-service canister	Contains a suitable combination of the absorbents mentioned above

mixture; but never *weight* per *volume*. Thus, 2 pounds of DDT in 100 gallons of water is not a two per cent mixture. Since 100 gallons of water weighs about 800 pounds, then two pounds of DDT would constitute a one-fourth of one percent mixture.

In preparing dilutions for field applications, one should avoid rigidly the philosophy that if a little is good, more is better. The recommended concentrations are the best compromise between safety from plant injury on the one hand and good control of the pest on the other.

Once the proper concentration of chemical has been prepared, the next problem is how much to apply. Rates of application are usually expressed as: pounds per acre, gallons per acre, pounds per thousand cubic feet, ounces per thousand square feet, gallons per tree, ounces per 100 feet of row, etc. In the majority of pest control operations, the rate of application is not critical and the operator may apply 50 per cent, or even 100 per cent, more than the recommended dosage without producing noticeable plant injury. Such over-dosing, however, injures the pocket book.

In some pest control operations, the rate of application is critical and over-dosing may lead to severe plant injury or other losses. Such is the case with many types of soil fumigation, seed treatments, blossom thining sprays, baiting for grasshoppers on range land, etc. In these cases, much attention has been given to rate of application and the recommendations on the label are based on extensive research. Deviation from these recommendations may be costly.

The weather, particularly temperature and humidity, is often an important factor in producing plant injury. Low temperatures rarely, if ever, augment chemical injury, but high temperatures frequently do. Thus, at high temperatures, 90°F. and above, sulfur dust or spray may injure apricots and strawberries, dinitro sprays and dusts will injure many types of foliage; and at temperatures over 100°F., refined oils may injure the foliage.

Humidity and dew point are occasionally responsible for injury by putting a chemical into solution so that it penetrates the leaf tissue. Such is the case with sodium fluosilicate dusts which ordinarily will not injure dry foliage. However, when the plants are covered with dew, the fluosilicate dissolves, penetrates the leaf tissue and causes injury. Frequently, a spray or dust residue will remain innocuous on the plant for two or three days after application and then cause injury to the plant following a sudden rise in temperature. The grower or applicator who uses chemicals known to be harmful at high temperatures must consider not only the temperature at the time of application, but also the forecast for temperatures for the next three days.

Accumulation of toxic quantities of chemicals in the soil is a real hazard in the case of certain very stable compounds. This condition now exists in certain apple orchards which were sprayed frequently with lead arsenate. The accummulation of poison is sufficient to inhibit the growth of the cover crop. Some of the chlorinated hydrocarbon compounds, especially DDT, are known to be stable in the soil and may persist for four or five years with little decomposition. The toxic quantity for DDT varies with the type of soil involved. Whereas 50 pounds per acre may be toxic in light soils, heavy soils may carry 100 pounds per acre without showing plant injury. Organic or peat soils probably can carry up to 200 pounds per acre before plant injury becomes apparent. Under certain conditions, therefore, with frequent applications, DDT may accumulate in toxic quantities.

In some instances, 2,4-D has remained in the soil in toxic quantities and injured new crops planted therein. 2,4-D breaks down in warm, moist soils in thirty to sixty days, but it may persist in cool, dry soils for six months or longer. More 2,4-D is retained by heavy soils than light soils. Flood irrigation will help to remove it, especially in warm weather. Ordinarily, it is not safe to plant susceptible crops the season following a spring or early summer treatment with 2,4-D.

Hazard to Human Health

MANY agricultural chemicals now in use are highly toxic to man, even in minute amounts. In practical pest control, the first possibility of poisoning occurs in trucking the packages to the farm, storage on the farm, and loading into the sprayer or dusting machine. The most insidious type of hazard to human health is found in those chemicals which can be absorbed through the skin. The grower or applicator should refer to the accompanying Table 1 to determine whether or not the chemical to be applied is one which can be absorbed in this manner. Outstanding examples in this group are tetraethyl pyrophosphate and parathion. If a package of such materials has broken in transit, and the cardboard container is saturated with the liquid, it should not be touched by the bare hands. Natural rubber gloves, not synthetic rubber, should be worn while handling such packages.

Several agricultural chemicals volatilize readily, giving off a gas which is toxic to man. Such chemicals should be stored in an open shed or barn which is not used to house livestock or to store any edible products. If the chemicals are stored in a tight room, the room should be opened for some hours before the operator spends any appreciable time therein. If a leaking package is discovered, it should be removed and the room aired thoroughly. Most hazardous chemicals, dangerous in the gaseous phase, possess strong odors which the operator soon learns to recognize; but a few dangerous materials, such as methyl bromide and cyanide, have little or no odor to serve as a warning. If extensive leaking of a hazardous, volatile material has occurred in a tight room which cannot be aired properly, the operator should wear a gas mask selected for protection against that particular compound, see Table 2.

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Nat'l Agricultural Chemicals Ass'n

in record-breaking conference at Flamingo, Miami Beach

AN over-all feeling of optimism that American agriculture will have sufficient quantities of pesticides to take care of contemplated needs, was expressed at the 1951 Spring Meeting of the National Agricultural Chemicals Association held at the Flamingo Hotel, Miami Beach, Fla., April 4-6.

Ernest Hart, president of the Niagara Chemical Division, Food Machinery Corp., Middleport, N. Y., NAC president, sounded this keynote in his address on the opening program Wednesday morning. The production capacity of the industry is splendid, he reported and the output will satisfy all requirements listed, or the probable requirements of domestic agriculture, he declared. He also stated that production of a billion pounds of pesticides is likely for 1951.

Regarding distribution, he said that the industry is making every effort to have in the hands of farmers the insecticides needed to protect crops. Pesticides may not be available to every person who desires a quantity, but they will be on hand for crop protection, he assured the group.

Avery S. Hoyt, Chief, Bureau of Entomology and Plant Quarantine, U.S. Dept. of Agriculture, Washington, D.C., described the workings of the BEPQ, emphasizing the need for further research toward development of new insecticides. He pointed out that although 1953 will mark the one hundredth anniversary of Federal Entomology in the U.S., it has been within the past ten years that a tremendous upsurge of pesticide development has been noted. Both the entomologist and the user have a tremendous range of materials from which to choose for specific pest control jobs, the BEPQ Chief pointed out, because of past research. A continuation of such research is not only desirable but essential, he said.

So many factors must be taken into account in appraising any insecticide, that a thorough study must be made on each material. "We must find the most effective material possible, but must be sure that it will not be harmful to the plant, the soil, the persons applying the pesticide, nor to public health and livestock.

In the Photo

At the head table at NAC banquet April 5: back row (L to R) Russell Stoddard, U. S. Industrial Chemicals, New York; John Paul Jones, Stauffer Chemical Co., New York; E. Phillips, G L F Soil Building Service, New York; W. W. Allen, Dow Chemical Co., Midland, Mich.

Seated (L to R): A. W. Mohr, California Spray Chemical Corp., Richmond, Calif., NAC vice-president; Ernest Hart, Niagara Chemical Div., Middleport, N. Y., NAC president; Fred Shanaman, Pennsylvania Salt Mfg. Co., Tacoma, Washington; Byron Webster, Chipman Chemical Co., Bound Brook, N. J.; G. F. Leonard, Tobacco By-Products & Chemical Corp., Richmond, Va.; and Paul Mayfield, Hercules Powder Co., Wilmington, Del.

He declared that it is the responsibility of the bureau to take every precaution at its disposal to see that no harm comes from application of these pesticides, and that they do their specific job effectively. Responsibility for these ends lies not alone with the Federal Government and the States, he said. The industry also shares in this, and it is to the mutual advantage of all to cooperate for best results.

Recent Research Cited

POINTING out the important developments in research during the past decade, Dr. R. M. Salter, Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md., presented a paper on "Recent Research on the Use of Agricultural Chemicals" The BPISAE chief pointed out the significance of chemicals in crop production in these times when growers are faced with labor shortages. He, too, commented upon the important role played by research in developing a wide range of new farm uses for chemical materials. "The potentialities of chemicals in agriculture at this time are comparable to those typified by hybrid corn fifteen years ago", Dr. Salter declared.

Although World War II is often cited as the time of great development in agricultural chemicals, they have now become a much more

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MEETING SIDELIGHTS

THE association's first Florida convention turned out to be an unqualified success. Instead of cutting attendance, the winter playground site helped in setting a new record. Registrations numbered nearly four hundred. And, as promised, the Florida hosts outdid themselves. Under the chairmanship of Mercer Rowe, Flag Sulphur & Chemical Co., Tampa, the local committees put on a fine show, and gave the guests a real Florida welcome. A water show, boat ride, bus tour, and a trip of inspection to the Citrus Experiment Station, and, above all, plenty of Florida sunshine, made everyone who was there glad he had made the trip. Other committee members, in addition to chairman Rowe, were, R. Allen, Brewster Fla., R. H. F. Dale, Jacksonville; C. F. Ladeburg, West Palm Beach; D. B. Maughan, and C. I. Remington, Orlando; W. L. Traylor, Apopka; H. H. True, Ft. Lauderdale; and J. W. Whitaker, Winter Haven.

* * *

The California contingent received a constant ribbing from confirmed Floridians who were quick to point out the virtues of the sunshine, the blue waters of Biscayne Bay, and the flavor of Florida orange juice, (which was available for free to all conventioneers, courtesy of the Florida Citrus Commission). The Californians, Howard Grady and A. W. Mohr, of California Spray-Chemical Corp., Richmond Calif., and R. A. Lamoree, Stauffer Chemical Co., San Francisco, Calif., were heard to admit that things looked "pretty good" in Florida . . . but they of course would decline being quoted lest the words should reach the ears of fellow Golden Staters.

* * *

Come to think of it, it wouldn't be such a bad idea to schedule a Florida mid-year meeting every couple years, —with a visit to California thrown in now and then, so as to compare the two brands of sunshine. The present program of the NAC board seems to be to move the mid-year meeting around from place to place, keeping the annual meeting at Spring Lake in September a fixture. And New Orleans could be a good spot for a meeting too!

* * *

The entertainment program included a night at the Dog Races, with an NACA canine handicap, presentation of the trophy to the owner of the winning dog by President Ernie Hart, and assorted awards to lucky dog pickers, courtesy of the Miami Kennel Club. Without a dissenting voice, Jack Miller was named champion dog handicapper.

* * *

The ponies too, fifteen miles away up at Gulfstream, pulled their

(Turn to Page 105)

W. M. ROWE — Responsible for local arrangements

A. F. CAMP — "Scientific cooperation is essential for results"

A. W. MOHR — Presides at opening session April 4

W. R. ALLSTETTER — Reports results of recent U. S. survey

L. N. MARKWOOD — Describes emergency functions of NPA

R. M. SALTER — "Research brings outstanding results"

ERNEST HART — Key to city from mayor's representative

Top photo (L to R): NAC president, Ernest Hart, with L. N. Markwood, of NPA and W. R. Allstetter, U. S. Department of Agriculture as each appeared on Friday's program.

Middle picture: "Grub" Leonard, NAC ex-president (left) and Jim Merritt (R), both of Tobacco By-Products & Chemical Corp., chat with Federico G. Morales, Havana, Cuba, insecticide manufacturer and distributor of "Black Leaf-40" products made by Tobacco By-Products.

Below: Avery S. Hoyt, chief, Bureau of Entomology and Plant Quarantine, Washington, (L), chats with E. L. Thomas, Swift & Co., Chicago and Dr. E. G. Kelsheimer, Vegetable Crops Laboratory, Bradenton, Fla.

potent tool for increased crop production and saving labor than they were during the late war. Many modern uses have been perfected since then, and many more appear to be highly promising in current research projects. As an example, he said that as recently as 1945, use of chemicals for weed control was highly restricted. But last year, more than 30 million acres of cropland were treated with herbicides in the U.S.

Scores of new advances in the use of chemicals for controlling weeds, fungus diseases, soil pests and for retaining and improving crop quality were mentioned by the BPISAE chief. He also pointed out the progress made in insect control and in the application of fertilizer materials. (The complete text of Dr. Salter's talk is published elsewhere in this issue.)

Winding up the first morning session with a distinctly local flavor, Dr. A. F. Camp, vice-director in charge of the Experiment Station, Lake Alfred, Fla., discussed some of the problems involved in arriving at an integrated spray schedule on fruit. He told, as an example, of using copper not only as a fungicide but also as a nutrient applied as a spray on leaves. In fertilizer, getting the corrective amount of copper into a mixture poses a major consideration, since too much is toxic to the plant.

Dr. Camp told how working on spray schedules brought together both entomologists and plant pathologists to solve overlapping problems such as the build-up of scale insects due to certain applications. Joint experimentations caused the altering of Bordeaux mixture to 3-3-100 proportion to ease the pressure from scale. The cooperation of entomologists, horticulturists and plant pathologists is necessary to arrive at workable recommendations, he said.

The importance of timing was emphasized by the speaker who explained that applications of oil emulsions in August affect the sugar and vitamin content of foods. Application at that time of year affects coloring, also. Thus, recommendations call for application of pesticides be-

fore August. Arsenic, he said, is not used as an insecticide, but rather to reduce the acidity of grapefruit and to make it more palatable. However, its use builds up scale populations, he said.

That many kinds of pesticides are frequently mixed and applied at once was brought out by the experiment station vice-director. He said that all kinds of combinations have been utilized, and that the present integrated program is the result of many years of work. Committees were named, and gradually, variable spraying schedules disappeared in favor of more uniform practices. Viewpoints were aired, he said, and a common need for better schedules was recognized and sought.

At luncheon at the Flamingo April 4, Willard M. Fifield, director of the Florida Agricultural Experiment Station, Gainesville, Fla., reviewed the activities of his station's work, pointing out the problems peculiar to the area. The absolute dependence upon chemicals to fertilize the soil; to protect crops from insect infestations and plant diseases and to prevent damage in storage was emphasized by the director who stated further that it would be impossible to provide adequate supplies of food and fiber without ample supplies of chemicals.

Agricultural chemicals were also credited with an important potential defense role by Mr. Fifield who declared that the best defense against biological warfare, so far as crops are concerned, is a plentiful supply of pesticides, both insecticidal and fungicidal. He pointed out the rapidity with which a foreign pest could develop in Florida's climate if dropped by enemy agents, and declared that the only way to stop such an invasion would be through all-out spraying or dusting of the affected area before it could spread.

A reception was held the evening of April 4, in the open air patio of the Flamingo preceding the annual dinner held later in the evening. Dancing was in order for the remainder of the evening.

Top row (L to R): Scene at water-ski show in Biscayne Bay. Skier dimly seen at left in mid-air over hurdle. Center: John Chase, Port Fertilizer & Chemical Co., Los Fresnos, Texas; Arthur Bixby, Pennsylvania Salt Mfg. Co., Philadelphia; Clyde Tandy, Jr., Port Fertilizer Co.; and Clark Bellamy, Acme Fertilizer Co., Wilmington, N. C. Right: Art Bixby again, this time at shuffleboard with G. W. Benbury, also of Pennsalt.

Bottom row, (L to R): Bill Prigmore, Eastern States Farmers Exchange, E. Springfield, Mass.; H. H. True, Rohm & Haas Co., Philadelphia; and C. L. Hovey, also of Eastern States. Center: Joe Noone, NAC, Washington, and Dr. R. M. Salter, chief of the Bureau of Plant Industry, U.S.D.A. (Lower right): Ed. Phillips, G L F, New York; Leo Grobe, NAC office, Washington; and Mrs. Alice Leopold.

Formulators Meet Thursday

THURSDAY'S schedule comprised an informal conference of formulators and basic manufacturers in a morning session, and a meeting of the NAC Board of Directors in the afternoon. That evening, the entire convention, along with other hotel guests, witnessed an hour's water ski show put on by the Florida Cypress Gardens through the courtesy of the Florida Agricultural Re-

search Institute. The young people taking part in the performance did numerous stunts on water skis, in the wake of speeding motor boats in Biscayne Bay. The show had been scheduled for Wednesday, but choppy waters forced postponement until the following afternoon.

Thursday evening, the group visited the dog track to attend a special performance in honor of the meeting attendants. Special buses transported the crowd to the races.

President Hart presided at the final morning session on Friday which featured governmental speakers who informed the NAC assembly about the supply situation, possible allocations, and the general picture as viewed from the capital.

W. R. Allstetter, deputy Director of the Office of Materials and Facilities, U. S. Department of Agriculture Production and Marketing Administration, emphasized the unusual importance of preparing for any eventuality regarding the need for agricultural pesticides. In addition to normal needs of the nation for food and fiber, agriculture is an important defense industry, he pointed out, and

In the Photos

(Editor's note: Some of the photos on this and succeeding pages were taken by hotel photographer without identification. We are sorry if names are missing, but we did our best at identification!)

Top picture: Eugene Perrin, Dow Chemical Co. (L); M. W. Ellison, Eric E. Heuermann and L. F. Stayner, the latter three of Shell Chemical Corp., New York.

Second shot: (L to R): Mrs. L. S. Hitchner, G. D. Baerman, Shell Chemical Corp.; Mrs. Baerman; Mrs. Jack Brunton; Jack Brunton, Kolker Chemical Works, Newark, N. J.; Mrs. Mercer Rowe; and Mr. Ellison.

Third picture: Jack W. Moore, Floridin Co., Warren, Pa.; F. A. Lucard, Pennsalt; N. M. Walker, Pennsalt; Mr. Ellison; Mr. Heuermann; Mr. Stayner; W. W. Abramitis, Ames, Iowa; Jim Merritt, Tobacco By-Products, Richmond, Va.; and Friar Thompson, Prentiss Drug, New York.

Bottom picture: W. W. Allen, Dow Chemical Co., Byron Webster, Chipman Chemical, Bound Brook, N. J.; Mrs. Hart; Mr. Perrin; Ernest Hart; and W. W. Sunderland, Dow.

as the emergency grows, so does the importance of having an adequate supply of pesticides on hand.

With this knowledge, plus the certainty that chemicals will be allocated in the event of a serious emergency, an effort has been made to survey the entire pesticide field to determine actual needs and probable supply. Never before, said Mr. Allstetter, has such a survey been made at the grass-roots level to find the end use of materials. This fact-finding effort has provided information of basic nature, including the plans of farmers for future crops involving pesticide use. Distribution to farmers, incidentally, can best be effected through free enterprise as long as the supply is adequate. The policy of the U. S. Department of Agriculture is to encourage production of an adequate supply of chemicals, Mr. Allstetter declared. It was possible from information gained through the survey, to estimate trends of pesticide use.

These figures, based on the trends, were given, DDT, 29% increase (1950-51); BHC, 36%; 2,4-D, 50%; dithiocarbamates, 10%; grain fumigants, 7%; parathion, 56%; TEPP, 23%; soil fumigants, 14%; toxa-

Eugene Witman, Columbia Chemical Div., Pittsburgh; E. J. K. Meister, "American Fruit Grower" magazine; Mrs. B. M. Van Cleve; A. J. Gunderson, Sherwin-Williams Co., Cleveland, Ohio; Mrs. Meister; Anne Witman and Mrs. Witman (foreground); Mrs. Gunderson; B. M. Van Cleve, Sherwin-Williams Co., New York; and J. R. Hile, Acme Quality Paints Co., Detroit, Mich.

Second photo: (L to Right) James Tolfaleti, Calspray, Orlando, Fla.; unidentified diner; Leo Gardner, Calspray, Richmond, Calif.; Russ Dorman, Calspray, Elizabeth, N. J.; J. S. Coey, Hooker Electrochemical Co., Niagara Falls, N. Y.; Douglas Maughan, Calspray, Orlando, Fla.; and Howard Grady, Calspray, Richmond, Calif.

Third picture: (clockwise around table): Mrs. R. L. Brandenburger; Jack Vernon, Niagara Chemical Div., Middleport, N. Y.; R. L. Brandenburger, Ralston-Purina Co., St. Louis, Mo.; Mrs. Vernon; A. F. Seay, Jr., Ralston-Purina; Mrs. R. H. F. Dade; Cecil Henderson, Niagara Chemical Div., Jacksonville; Mrs. Henderson; and R. H. F. Dade, Niagara Chemical Div., Jacksonville.

Bottom shot: Getting registered for convention. Lee Grobe (standing), NAC Washington office, gets list from Lea S. Hitcher, Association secretary. Behind him are: W. Mercer Rowe, John Rodda, Hoyt S. Avery and Dr. R. M. Salter. Girls in picture assisted in registration work.

phene, 68%; and calcium arsenate, 31%.

Mr. Allstetter concluded by pointing out a milestone of the century thus far: "In 1951 we have run out of acres". The obvious answer to this is the necessity of producing more crops per acre, he declared.

Although a representative of the Delaney Committee, Washington, was to appear on the program of Friday, he was unable to be present at the meeting. Chairman Hart then called upon Dr. H. L. Haller, newly appointed Assistant Chief of the Bureau of Entomology and Plant Quarantine, U.S.D.A., to make a few extemporaneous remarks. Dr. Haller reiterated the need for continued cooperation between the industry and the governmental agencies, particularly in view of the complex situation as regards pesticides. He reviewed the changing scene where only a decade ago just a few pesticides were depended upon to do a complete control job. Today, by comparison, there are literally scores of new complex or-

(*Turn to Page 94*)

Registering at the Flamingo, just off train from north (note coats under arms). (L to R) L. S. Hitchner, NAC secretary; Frank Holland, Florida Agri. Research Institute, Winter Haven, Fla.; unidentified, partly-hidden conventioneer; T. H. Tennant, Ethyl Corp., New York; George Krieger, Ethyl Corp., N. Y.; "Pete" Petrus, Cotton States Chemical Co., West Monroe, La.; and John F. Kirk, General Chemical Div., New York.

Second photo: (Standing, L to R): L. G. Matthews, American Smelting & Refining Co., New York; David W. Lynch, Prentiss Drug & Chemical, Chicago; Robert S. Thompson, Thompson-Hayward Chemical Co., Kansas City, Mo.; W. J. F. Francis, Pennsalt, Tacoma, Washington; Byron Webster, Chipman. (Seated) Jack Brunton, Kolker; Fred Shanaman, Pennsalt, Tacoma, Washington; and Joe Noone, NAC Association, Washington.

Third photo (standing) R. F. Allen, American Cyanamid Co., Brewster, Fla.; H. J. Langhorst, Cyanamid, New York; Mr. Francis again; W. K. Self, Riverside Chemical Co., Marks, Miss.; and unidentified gentleman. (seated, L to R): Unidentified lady; Mrs. Hitchner; Irving Bales, Chipman; another unidentified lady; Frank Maughan, Rohm & Haas Co., Philadelphia; Mrs. Self; Mr. Webster; and Mrs. Rowe.

Bottom photo: (Standing L to R): Art Mohr; Anne Witman (who took part in awarding prizes at banquet) and Ernie Hart. (seated) Bill Allen, Dow; and Fred Shanaman, Pennsalt.

Herbicides

by
W. W. Allen*
Dow Chemical Co.,
Midland, Michigan

DEVELOPMENTS in the field of agricultural chemicals, during the past decade, have been amazing. The number of new materials introduced to replace or supplement older materials opens new horizons of pest control for the farmer and commercial grower of plants. Among the most significant of these innovations was the development of new herbicides which has paralleled and was often more spectacular than the rise of pesticides as a whole.

Some ten years ago, the entire market for herbicides could not have been much more than an estimated million and a half to two million dollars per year. All reports indicate that during 1950, the market for herbicides was 12 to 15 million dollars. This is merely the cost of the chemicals or their formulations. It does not include the cost of equipment and labor. This dollar volume or cost to the farmer would probably double if the other factors were taken into consideration. This is truly a remarkable growth in ten years. The number of new herbicides being introduced or tested each year is large and continued development in weed control may be expected over the next few years.

One interesting fact is that sodium chlorate, one of the most extensively used and one of the older general herbicides, has increased in volume with the advent of the newer herbicides. In many cases, the new herbicides have replaced sodium chlorate, yet the overall increase in interest and use of all chemical herbicides has resulted in an increased use of sodium chlorate. The increase in labor costs and the scarcity of farm labor or adequate farm labor has greatly intensified the amount of effort put into this field by agricultural colleges, the USDA, and industrial research laboratories. The farmer has been very quick to adopt most new devleopments in order to cut his labor costs.

Salt as Herbicide

HISTORICALLY, salt was probably one of the earliest herbicides. It still sees some use, but it is generally inefficient in performance. Iron sulfate was used in England and later in the U. S. to control dandelions and other weeds in lawns and fields but due to discoloration and lack of satisfactory kill, it was later abandoned. Sulfuric acid has been used to kill weeds in lawns and fields. Sodium arsenite has had extensive use to control weeds on golf turf and in the field in a number of instances. Sodium chlorate is probably the principal general herbicide in use during the past 15 or 20 years. This general herbicide controls grasses and weeds and sterilizes the soil over a period of time. It has some undesirable features, such as its fire hazard, and sterilization of soil so that crops cannot be replaced within a short period of time.

* Presented at Pesticide Symposium, Chemical Engineers Club, Washington, D. C., Nov. 13, 1950.

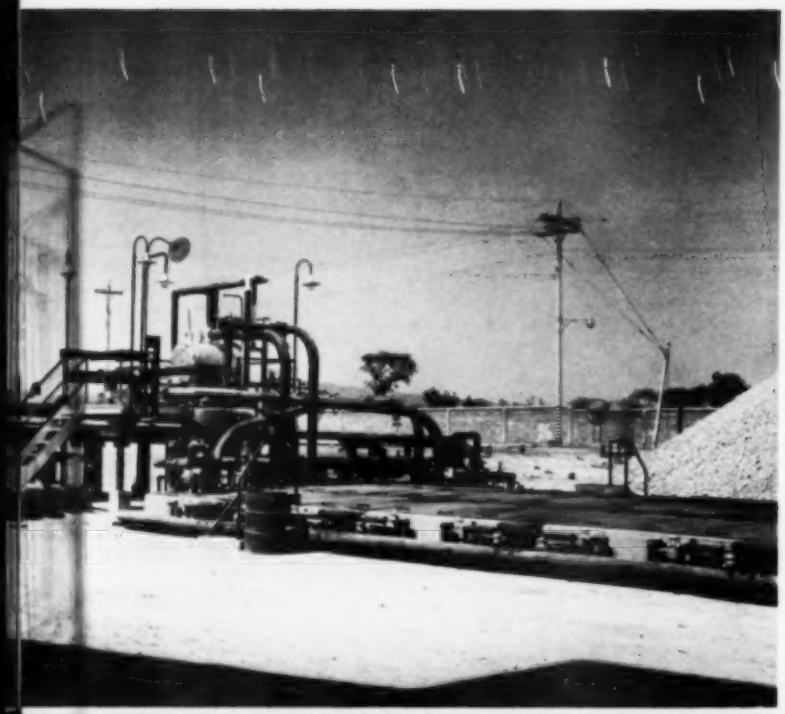
Contact Herbicides

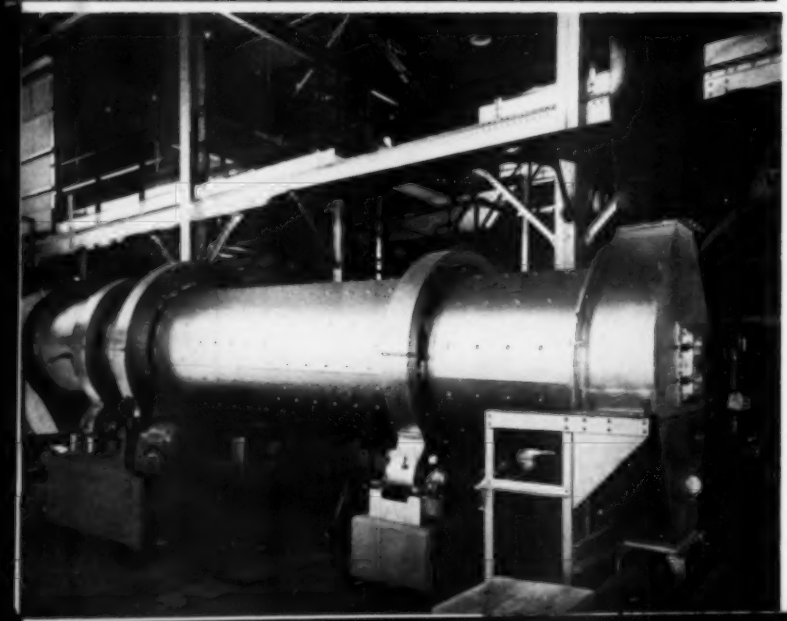
HERBICIDES can be divided into several categories. The first is selective contact herbicides. Dinitro cresol was first brought to our attention by the French and has been used successfully in the U. S. as a sodium salt. The ammonium salt of dinitro-ortho-secondary-butylphenol has been used, and in many cases, replaced the dinitro-ortho-cresol. These materials owe their action to the selective wetting of the weeds and not the crop plant. The principal application is on grains which have a waxy, smooth surface. The principal weeds have hairy-like projections or other characteristics that retain the chemical and result in burning of the weed so that it dies or is seriously deterred in growth. These chemicals are applied at the rate of approximately 1 pound to 2 pounds of active ingredient per acre and a total volume of 80 to 120 gallons per acre.

Dinitro-ortho-cresol is manufactured by sulfonating and then nitrating ortho-cresol. Ortho-secondary-butyl-phenol is synthesized from butylene and phenol. There is considerable para isomer resulting from this reaction which is used in other applications such as resins. The ortho-secondary-buhyl-phenol is sulfonated, then nitrated to get the desired product. It is interesting to note that the 2-4 position for the nitro groups gives higher weed control than when

(*Turn to Page* 97)

New Fertilizer Plant





NEWEST addition to the world's modern fertilizer manufacturing facilities is the plant recently completed for Guanos y Fertilizantes S.A. near Mexico City, Mexico. Operations at the plant producing basic nitrogenous fertilizer materials got under way April 1. The plant which is located near Mexico City, was designed and supplied for Guanos y Fertilizantes by the Chemical Construction Corporation, New York. The huge installation includes three separate and complete plants, a synthetic ammonia unit, an outdoor contact sulfuric acid unit, and an ammonium sulfate plant. The synthetic ammonia unit is the first ever to be built in Mexico.

According to the operators, 70,000 tons of low-cost ammonium sulfate per year will be produced for soil improvement in Mexico. The process will function continuously and the basic raw material will be natural gas. The new installation also includes equipment for the generation of power and process steam, deep-well water pumps within the works, and other general facilities.

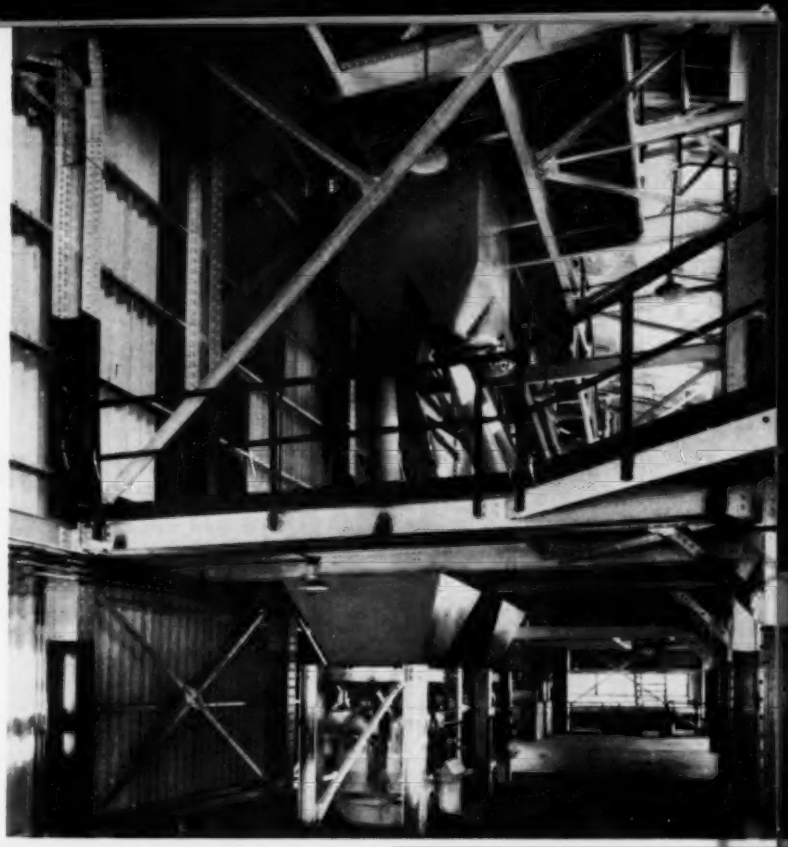
Sulfur from which the sulfuric acid is manufactured is obtained from the hydrogen sulfide content of the natural gas. This is reduced to elemental sulfur at the gas field, transported to the plant site, burned to form sulfur dioxide which is then converted to acid in one of the most modern type contact plants.

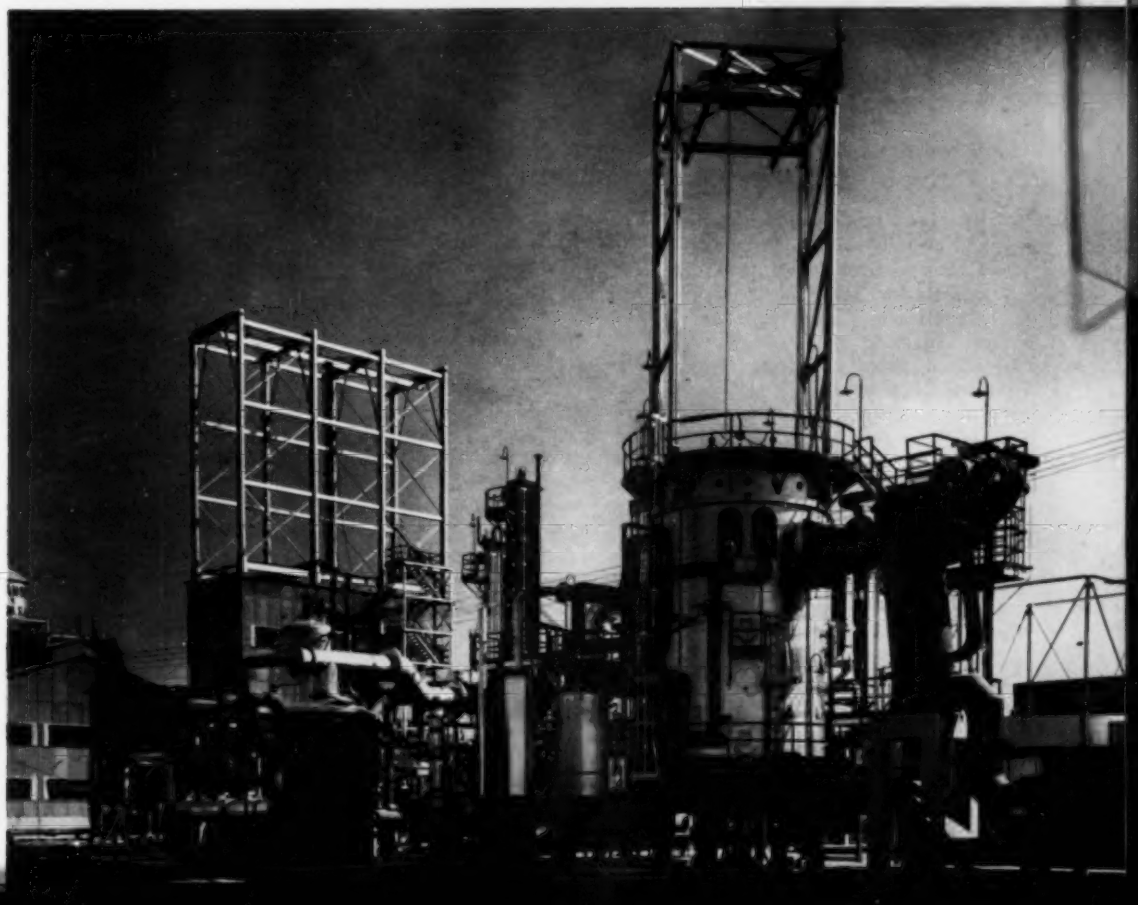
Guanos y Fertilizantes S.A. is one of the largest and most prominent fertilizer producers in Mexico.

High Capacity Unit in Mexico to produce 70,000 tons Annually

★ ★ ★

First synthetic ammonia plant starts operation in Mexico . . . views of the new ammonium sulphate installation near Mexico City . . . (top left photo) sulfur melting pit and sulfur filler for the contact acid plant . . . (lower left) ammonium sulfate dryer . . . (upper right) ammonium sulfate bagging operation with feed line and scales . . . (lower right) ammonia synthesis and gas reforming plant. See front cover for view of contact sulfuric acid plant. Photos by Elwood M. Payne.





New technological developments promise increased crop production through better control of insects, plant disease and weeds; and at same time offer significant labor savings through increased uses of

Agricultural Chemicals

ALTHOUGH some may regard modern farming as having about reached its limit of productivity, actually nothing could be farther from the facts. We are now witnessing the development of several *new* technological developments in agriculture that promise real, concrete means for increasing efficiency of crop production and for expanding our capacity to produce during the emergency.

One of the most important of these developments is centered around the agricultural chemical industry. Since chemicals are highly important as a farming tool, we welcome the opportunity to discuss some of the recent research on their use in agriculture. However, this paper will be limited to the line of investigations carried on by the Bureau of Plant Industry, Soils and Agricultural Engineering and cooperating State and private institutions whose work with chemicals includes herbicides, fungicides, soil fumigants, chemicals for retaining and improving crop quality and methods for applying chemicals generally in farming. Fertilizers and insecticides will be mentioned only incidentally.

Let's begin with the use of chemicals in controlling weeds where recent progress has been phenomenal. Developments have gone far beyond the imagination of the most fantastic dreamer of only ten years ago. As recently as 1945, the use of herbicides in agriculture was highly restricted. By 1949, more than 28 million pounds of 2,4-D were manufactured in the United States.

Today, chemicals are being used as a supplemental weed control tool in the production of such field crops as corn, wheat, oats, barley, rice, flax, sorghums, pastures, meadows, cotton, peanuts, sugar beets, sugarcane, and others. Satisfactory chemical weed control methods have been worked out also for horticultural, ornamental, and vegetable crops. It has been estimated that last year farmers applied herbicides to more than 30 million acres of cropland in the United States.

Also, herbicides are being used more and more on non-cropped land. The use of chemicals for controlling brush and stump sprouts along railroad right-of-ways, power lines, communication transmission lines, highways, and canal ditches is rapidly replacing hand cutting in all parts of the country where woody plants are a problem. Herbicides are being used annually on several hundred thousands of miles of highway road banks and farm fence rows.

The discovery of 2,4-D stimulated intensive interest in the use of a wide variety of chemicals for weed control. During the past five years herbicidal investigations have mushroomed all over the country. Few people realize the extent to which chemicals are being studied for weed control purposes. Major projects are underway in every state, by both public agencies and commercial firms. A bibliography of weed investigations issued this winter by our Weed Division lists nearly 2,500 different papers on weed control published in various journals during 1950. About 90 percent of them dealt with chemical weed control in one phase or another.

While 2,4-D is the most widely used herbicide, practical uses are now being found for many other chemicals, such as 2,4,5-T, IPC, TCA, ammonium sulfamate, cyanamid, chlorates, arsenicals, boron compounds, dinitro compounds, herbicidal oils, and others. Initial investigations with these chemicals determined their effects on various species of weeds. The current trend is to concentrate study on weed control in specific crops under specific problem conditions. Studies are underway on almost every crop in American agriculture.

Intensive study is being given to time and method of application of different chemicals as pre-emergency

by

R. M. Salter*

Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering
U. S. Department of Agriculture, Beltsville, Md.

herbicides, translocated herbicides, contact herbicides, and soil sterilants under specific conditions. With some crops, effective results are being obtained through pre-emergence applications. With other crops, post-emergence applications are best. On some sensitive crops, sprays are directed to shield the crop from the chemical while spraying the weeds. Season-long weed control has been obtained experimentally with some crops by using a combination of these practices.

One of the most signicant current developments is the use of chemicals as pre-emergence sprays; killing the weed seedling during germination. The chemical is applied on the surface of the soil after the crop has been planted but before seedlings come up. Seedlings of some crops can grow through treated soil without damage while the seedlings of most broad-leaved weeds and annual grasses are killed as they germinate in the top ¼ to ½ inch of soil. This gives effective weed control without cultivation for a period of several weeks after planting.

Promising results from pre-emergence treatments have been found with sugar beets, cotton, peanuts, soybeans, potatoes, corn under certain conditions, asparagus, gladioli, and other field and horticultural crops. The sugar beet industry in the mid-west is enthusiastic about using TCA as a pre-emergence weed control measure to reduce the need for weeding in sugar-beet fields. Many grower contracts this year provide for pre-emergence weed control, with beet companies footing part of the cost of treatment. They expect this measure to eliminate the need for many hand laborers in sugar-beet fields.

Labor Saving Great

SCIENTISTS studying weed control in cotton have obtained excellent results in controlling weeds in-the-row by using pre-emergence applications of dinitro compounds followed by post-emergence applications of herbicidal oils. In one Mississippi test last year the combination of pre-emergence and one post-emergence application of herbicidal oil gave effective in-the-row weed control at a cost of $6.55 per acre compared to $14 per acre for hoeing.

Hill dropping of cotton seed was found to be important to the success of the pre-emergence chemical treatment. When hill dropped, the seedlings come up in a bunch with enough force to actually push the soil away from the young plants, thus preventing damage from the herbicide. Post-emergence sprays need to be so directed that the herbicidal oil cannot hit cotton plants above the seed leaves.

Some cotton growers already are turning to these chemicals as a means of off-setting the shortage of labor for hand hoeing. If they get good results this year, many additional growers will undoubtedly adopt the practice in order to expand cotton production despite labor limitations.

Cotton production in the United States still requires an average of about 100 man-hours of labor per acre. When we realize that much of this labor is needed for hand hoeing, the enormous potentials from chemical weed control in cotton become readily apparent. There is no doubt about it. Pre-emergence herbicides have a big future.

Chemical treatments have also been perfected for solving some difficult weed problems in irrigated areas of the West. There, the extent of crop production is determined largely by the supply of irrigation water. Pest plants in and along irrigation channels can draw off large quantities of water before it reaches the crop land to be irrigated.

Recent research on this problem has yielded effective chemical measures for controlling many of the pest plants. Growth controlling chemicals can be used to kill willows, cattails, and other weed vegetation growing along the banks of irrigation ditches and canals. Aromatic solvents, injected into the water channel, will control submerged weeds for only one-tenth the cost of mechanical clearing.

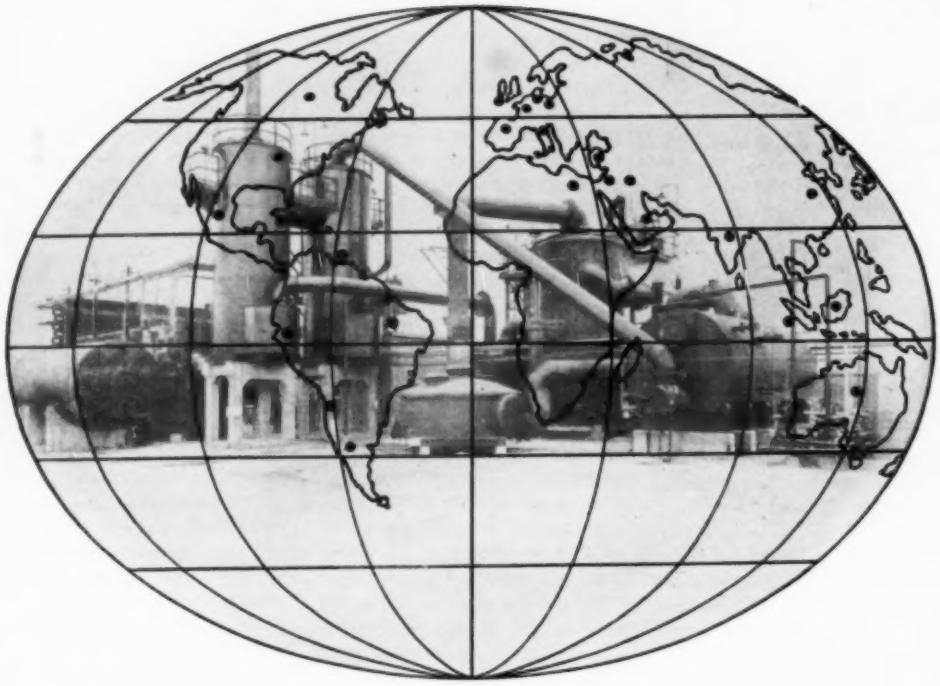
Brush Control Important

THE discovery that plant hormone type chemicals will kill some kinds of brush at relatively low cost offers new means for expanding beef production on range land in the Southwest. More than 100 million acres of formerly productive grasslands in that area have been invaded by mesquite and other unwanted brush plants during the past half century. The brush has greatly reduced the carrying capacity and the productiveness of the native range. Scientists who are in close contact with the problem have estimated that removal of brush from this range land would provide potentially an additional 500 million pounds of beef annually.

In Oklahoma, airplane applications of 2,4-D are proving to be economical and effective for killing sand sagebrush. Several hundred thousand acres have already been sprayed. In experiments at Woodward per-acre beef production has been increased *two* to *four* times through pasture re-seeding and the killing of sagebrush.

In Texas, a 2/3-pound per acre airplane application of 2,4,5-T has given effective control of mesquite under certain conditions. Wide-scale tests were conducted last year

*From paper presented before National Agricultural Chemicals Association, April 4, 1951, Miami Beach, Fla.



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2. FLEXIBILITY in operation from 30% of capacity to more than rated capacity without "blanking off" or other operations that consume time and labor.

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CUBA	FRANCE	INDIA
TRINIDAD	SPAIN	SUMATRA
CURACAO, N.W.I.	ITALY	BORNEO
ARGENTINA	TURKEY	AUSTRALIA
BRAZIL	EGYPT	CHINA
CHILE		JAPAN

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

on about 4,000 acres of range land over an area 360 miles wide and 700 miles long. Officials of the Texas Production and Marketing Administration and individual ranchers are so enthusiastic about the results they have set a goal for spraying one million acres of range land in 1951.

Although the progress of this research is highly encouraging, complete solution of the brush problem in the Southwest is still to be attained. For one thing, periodic re-spraying for mesquite control will probably be needed every five or ten years. Furthermore, there are many other kinds of brush that complicate the problem for which effective killing chemicals have not yet been found. When the mesquite is killed, other types of brush have a tendency to take over.

Many other developments in chemical weed control also promise to help farmers save labor and increase production. The point to be stressed is that the use of herbicides is now firmly established in agriculture. Chemical weed control is *here to stay*. It is important, however, to recognize that herbicides are basically a *supplemental* weed-control tool. Chemicals will not replace efficient cultural methods of weed control, but they promise to become an ever increasing adjunct thereto, especially as uses for chemicals are further developed to meet specific problem conditions.

Fungicide Developments

EQUALLY dramatic progress is being made in research with chemicals for controlling fungus diseases of plants. The most important advance here has been the discovery that an array of complex organic materials such as dithio carbamates, phenyl mercury compounds, dichloronaphthoquinone, gloxyalidines, dinitro compounds, and phthalimide derivatives, are effective fungicides. These materials represent the end-product of a decade of close teamwork between the chemical industry and plant pathologists.

Generally, these compounds are more specific in their action than the older fungicides, and they often give more effective disease control. Their use reduces demands for strategic materials such as copper and sulphur. Recent estimates indicate that more than ten million pounds of organic fungicides were devoted to agricultural uses in 1950. Research is now being intensified to develop even wider uses for them.

Significant progress has been made in controlling fungus diseases of tree fruits. Copper and sulfur are effective fungicides, but they sometimes cause considerable injury to fruit and leaves. Organic chemicals are proving to be equally effective for disease control with less risk of plant injury. Sulfur sprays, for example, are impractical for use on Anjou pears because of extensive fruit damage. The new dithio carbamate compounds give excellent disease control without fruit damage. Their use has increased Anjou pear production 300,000 boxes annually.

Organic compounds have solved most of the problems of fruit damage from copper fungicides, and promise solution to damage from sulfur under many conditions. Mercury compounds appear effective against apple disease problems in the East, but lack the lasting power of sulfur. Fruit pathologists are now testing combinations of chemicals to solve this problem. Pathologists have not yet found a fungicide better than sulfur for the control of peach diseases.

Until recently, potato and vegetable growers depended almost entirely on copper fungicides. Here again copper is effective, but can cause injury to some vegetable crops. Organic fungicides of the dithio-carbamate group are less injurious than copper compounds, and with some vegetables they give more effective disease control. The new organics are replacing older fungicides for the control of late blight of potatoes, tomatoes and many other vegetable diseases - especially in the South.

New chemical disease control methods are coming into use with certain bulb crops, too. For example, phenyl-mercury-acetate looks good for controlling fusarium basal rot of daffodil bulbs without flower injury. Commercial bulb growers in the East lose half of their daffodil bulbs without treatment. Gladiolus diseases in Florida are being effectively controlled with chemical treatment after harvest and before storage.

Seed-borne and soil-borne fungus diseases in corn, wheat, barley, oats, grain, sorghums, rice, cotton, sugar beets, and certain vegetable crops are being more effectively controlled with new compounds used for seed treatment. Only recently peanuts were added to that list. Such fungicides as "Arasan" and "Spergon" have made peanut seed treatment effective with increases ranging up to 25 percent in yield.

Spraying and dusting for disease control has previously been considered impractical with field crops because the cost of application is high in comparison with the moderate yield increases that can be expected. It is interesting to note that investigations for the field treament of wheat rust are now being initiated in an effort to find a fungicidal protection against the new race of wheat stem rust that broke out last year.

In the field of fungicides generally, the trend toward organic compounds is expected to continue. A large number of new organic materials are now being tested, and there is no doubt that more and more tailor-made compounds will be found to solve specific disease problems.

Nematode Control

IMPORTANT progress is also being made with soil fumigants for controlling nematodes, insects, and other soil pests. This is a relatively new field for chemicals in agriculture. The recent discovery of less expensive soil fumigants is now making nematode and wire-worm control possible under field conditions. To be able to protect the underground parts of plants against soil pests, represents an enormous forward step.

Nematode damage is most severe in the warmer regions of the United States where the long growing season is favorable for rapid multiplication. The root knot nematode affects tobacco, cotton, peanuts, corn,

(Turn to Page 101)

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American Plant Food Council

PAUL T. TRUITT, APFC Pres.

MEMBERS of Congress, government agriculture officials, soil scientists, representatives of the farm press and radio farm directors and spokesmen for county agents and vocational teachers will appear on the program for the sixth annual convention of the American Plant Food Council, to be held at The Homestead, Hot Springs, Virginia, June 14-17, according to Paul T. Truitt, Council president.

W. T. Wright, vice-president, F. S. Royster Guano Company, Norfolk, is chairman of the 1951 Convention Committee and other members are: John V. Collis, president, Federal Chemical Company, Inc., Louisville; J. A. Howell, president, Virginia-Carolina Chemical Corp., Richmond; A. F. Reed, vice-president, Lion Oil Company, El Dorado, Ark; and Paul Speer, vice-president, United States Potash Company, New York City.

Approximately 500 Council members and their guests are expected to establish a new convention attendance record, a Council spokesman said.

Mr. Truitt will open the convention program with the annual address of the Council president Friday morning, June 15.

United States Senator Allen J. Ellender (D-La.) Chairman of the Senate Committee on Agriculture and Forestry, will be the second speaker on the opening day. His subject will be "Agriculture . . . Our First Line of Defense."

Dr. H. T. Myers, head of the agronomy department, Kansas State College at Manhattan, will be the final speaker on the opening day. His subject will be "Fertilizer Use in Relation to Animal Nutrition."

Brannan Appears June 16

SECRETARY of Agriculture Charles F. Brannan will be the first speaker at the second session of the convention Saturday morning June 16 on the subject of "Farming in a Defense Economy."

Another high-light of the convention will be an agricultural forum Saturday morning on the subject of "Fertilizer's Contribution to Better Living." The speakers are expected to include: Dr. Paul D. Sanders, Editor, *The Southern Planter*, Richmond Va., - Moderator; Ferdie Deering, president, American Agricultural Editors Association; Dr. R. Frank Poole, president, Association of Land-Grant Colleges and Universities; Phil Alampi, president, National Association of Radio Farm Directors; Edwin Bay, president, National Association County Agricultural Agents; and

(*Turn to Page* 95)

SEN. A. J. ELLENDER

SECRETARY BRANNAN

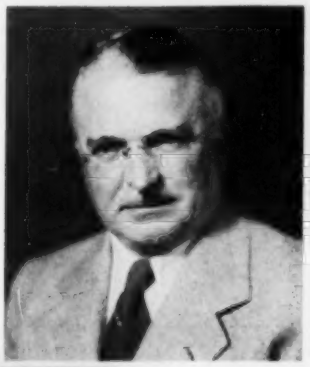
WALTER H. JUDD

NFA

Holds 26th Annual Convention June 11-13 at Greenbrier Hotel

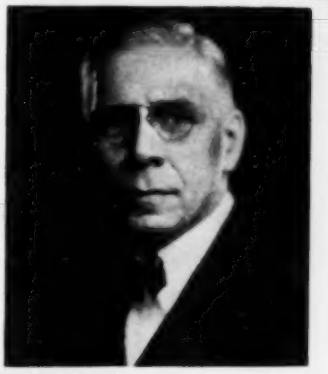
PROBLEMS relating to the national agricultural picture in general and the fertilizer industry in particular, will be discussed by leading authorities of the U. S. Department of Agriculture, industry heads, and members of Congress at the 26th annual June convention of the National Fertilizer Association, June 11-13. The meeting will be held at the Greenbrier Hotel, White Sulphur Springs, W. Virginia. A record turnout is expected, judging from advance registration, an NFA spokesman said.

Speakers who already have accepted invitations to address the group are Senator Clinton Anderson (D.-New Mexico), former Secretary of Agriculture; E. G. Nourse, former chairman of the President's Council of Economic Advisors, who has just received one of the John Simon Guggenheim fellowships for study in private enterprise; and Edward J. Condon, president of the Friends of the Land and assistant to the president of Sears Roebuck and Co.



(Above)
J. E. TOTMAN
NFA Board Chairman presides opening day

SEN. CLINTON ANDERSON
Former Secretary of Agriculture to talk



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EDWARD J. CONDON
Friends of the Land President on program

On the opening day, June 11, the Association's board of directors, headed by J. E. Totman, president of Summers Fertilizer Co., Baltimore Md., will meet. Also, the Plant Food Research Committee of NFA will hold an open meeting, the chief feature of which will be a panel reviewing recent research on corn growing, over which Proctor Gull, chairman of the corn subcommittee will preside.

In addition to the general sessions on the 12th and 13th, several social and sports events have been arranged. For the ladies, a garden party will be held on June 11 and a bridge party on June 12. There also will be golf and tennis events for the ladies and golf, tennis and horseshoe pitching contests for the men.

Industry Able and Eager to Produce

by

Ernest Hart

President, National Agricultural Chemicals Assn.
(From talk given at NAC meeting, Miami Beach)

THERE are good reasons for optimism as we appraise the 1951 outlook for agricultural chemicals, although it is obvious that this feeling should be tempered by the uncertainties and new problems created by the Korean War and the still genuine threat of another global conflict.

There is reason for optimism as we view the heavy demand for industry's products, both for agricultural production and for health programs. This demand stems basically from the increased recognition of how vital are industry's materials to an efficient agriculture, and to the protection of mankind against diseases spread by insects. Surely this recognition augurs well for industry, not alone for 1951 but for later years when - we all hope - shortages of some basic chemicals will be but an unpleasant memory.

All of us recognize, of course, that an almost unprecedented demand for our products presents difficult problems. Many of our materials are manufactured from a few basic chemicals which are vital also to other defense production needs. In some instances - benzol and chlorine, for example - the basic chemicals are not available in sufficient volume to meet all of the demands for them. This can only mean that our industry, as well as some other segments of the chemical industry, will be forced to get along somehow with a lesser supply of some chemicals than they could use and would like to have. But that is an inevitable circumstance of any war or defense economy.

With respect to certain products, therefore, our industry cannot expect to produce enough to meet the demand in full measure. Industry can and will produce to the extent that basic chemicals are available for its purposes.

Despite existing shortages of certain basic chemicals, the overall picture is nevertheless promising. The range of insecticides and fungicides and related chemicals is indeed a wide one, and fortunately it appears that alternates in ample quantities will be available for any materials which may be in short supply. It is my considered judgment that no farmer in 1951 should lack pesticides necessary to protect his crops from insects and diseases.

Industry Can Produce

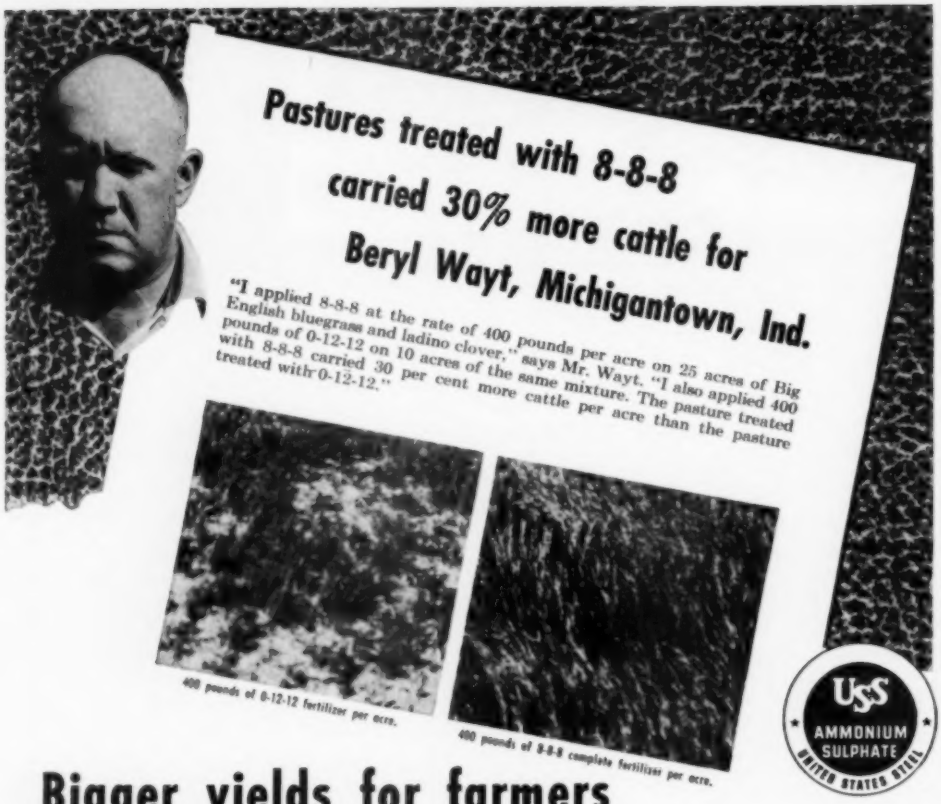
MY optimism is based in part on the high productive capacity of the industry. Our facilities for production have been increased substantially since the end of World War II. Industry's capacity to produce now stands at the highest rate in history. Present indications are that a *billion pounds* of pesticides will be manufactured in 1951. This record production should be enough to meet the requirements listed by the U.S. Department of Agriculture for the protection of food and fibre crops. We hope that this increased capacity will also be sufficient to meet the demand for use of our products in other countries.

But I again repeat and re-emphasize—industry must be supplied with the basic raw materials. Given an adequate supply of these chemicals, the pesticide industry will meet its responsibilities.

Industry also finds reasons for optimism in its improved system of distribution. The existing channels of distribution, built up and strengthened over a period of years, are efficient. They represent the best means of distributing agricultural chemicals to points of insect infestation in time and in quantities ample to meet present and anticipated needs. A distribution map is now in the process of preparation as a means of showing where pesticide stocks are available for quick distribution as needed. Both on the record of the past and on the plans already drawn for 1951, it is clear that government assistance is not needed by industry in the field of distribution.

All of us in industry must recognize our obligation to see that no farmer goes without needed pesticide materials in 1951. As we all know, food and fibre are of vital importance in our nation's defense program. Production of food and fibre as called for by national defense goals will be impossible without adequate chemical protection of crops and livestock. This inescapable fact is recognized not merely within industry and by the farmer but also by our Land Grant Colleges, the Department of Agriculture and by other agencies of government. It is of course the responsibility of our industry to produce the essential pesticides. This is a responsibility all of us recognize and intend to discharge, given the necessary raw ma-

(*Continued on Page 93*)



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The Listening Post

Fungicide Tests Show Good Results

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

M. B. LINN, of the University of Illinois, states that in Cook County, Illinois, the pelleting of bulb-onion seed with "Arasan" (50% thiram, non-wettable in water) has replaced almost entirely the formaldehyde-drip treatment as a control for onion smut caused by the fungus *Urocystis cepulae*. The standard dosage and treatment is one pound of fungicide to one pound of seed which is moistened prior to pelleting with 5% "Methocel" (Dow methyl cellulose) sticker solution (tests in Illinois show that the addition of commercial glycerin, 10% by volume, as a plasticizer reduces shattering or flaking-off of the fungicide, presumably by making the "Methocel" film less brittle on drying). That this is a fairly simple treatment is evident from the fact that practically all onion-seed pelleting in Illinois is done by the individual grower. Many growers use a rotating, wooden butter churn to mix seed and fungicide, treating five or more pounds at a time.

This method of treatment leaves much to be desired because of the necessity of holding relatively heavy dosages of fungicide on the seed. "Arasan" does not stick to the seed as well as "Tersan" (50% thiram, wettable) and tends to cause more "bridging" of the seed in the drill box. However, it has given appreciably better smut control than "Tersan" and control comparable to formaldehyde in experimental tests and in comparative tests by growers. For these reasons, "Arasan" is used more widely than "Tersan" by Cook County growers despite the fact that "Tersan" was the first dust fungicide used on a commercial scale for smut control in the county. Difficulties in obtaining an even flow of seed from the drill have been overcome to some extent by stirring the "Arasan"-pelleted seed in the hopper with a wooden paddle at infrequent intervals.

In 1950, experiments were conducted, designed to find ways to reduce the fungicide-seed dosage ratio and at the same time to maintain the concentration of thiram. Various concentrations of thiram were tested to determine their effect on onion seed emergence in flats, on the rate of seeding, and on smut control in the field. In addition to "Arasan" and "Teresan," these included technical thiram (Monsanto Chemical Company, St. Louis, Missouri, supplied a finely

Table 1

The effect of various concentrations of thiram on emergence of old and new onion seed.

Fungicide	Percentage thiram	Damage level on seed (%)	Amount of Methocel/glycerin solution %	Percent emergence 1946 seed Test 1 Soil	1946 seed Test 2 Soil	1946 seed Test 2 Sand	1946 seed Test 1 Soil	1946 seed Test 1 Sand
Thiram	100	100	50[a]	19.0	21.6	26.6	76.6	85.0
"	"	75	25[b]	18.0	—	—	88.3	93.3
"	"	50	20	25.0	—	—	95.0	98.3
Arasan	50	100	50	11.5	20.0	3.3	63.3	45.0
Tersan	50	"	40	—	—	—	86.6	85.0
Arasan SF	75	"	40	17.0	51.6	26.6	70.0	76.6
" "	"	75	25	27.5	33.3	43.3	96.6	86.6
Check	—	—	—	68.0	76.6	60.0	98.3	93.3

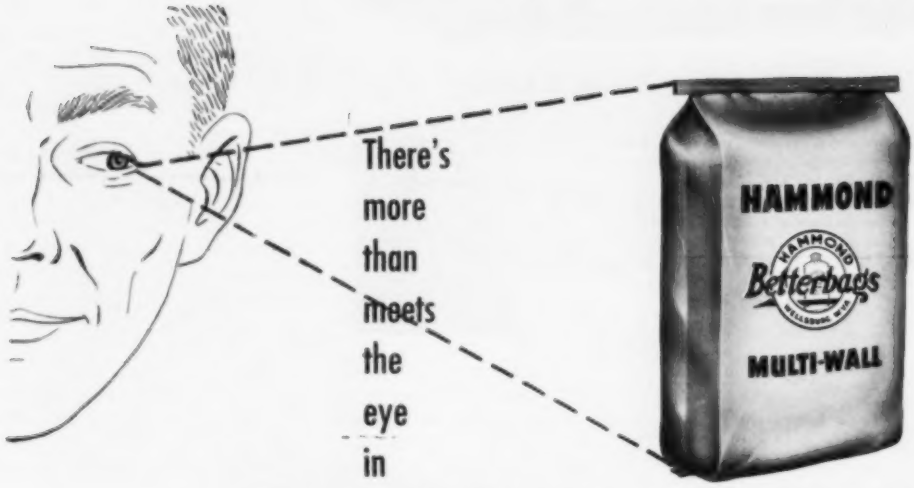
[a] Originally set at 30%; but increased through error.
[b] Roughly equivalent to 1 pint to 4 lbs. of seed which is the rate usually recommended.

Table 2

The effects of various concentrations of thiram on rate of seeding and control of smut in bulb onions. (Seeder plate hole No. 8 used for pelleted seed, No. 7 for check).

Fungicide	Percentage thiram	Dosage level on seed (%)	Pounds of thiram actual per acre[a]	Mean no. feet of row - 200 plants	Percent smut June 22	August 2	September 8 (harvest)
Thiram	100	100	4	72	0.5	13.5	19.6
"	"	75	3	49	3.9	14.9	21.5
"	"	50	2	52	5.6	19.7	30.5
Arasan	50	100	2	45	8.5	30.5	45.7
Tersan	50	"	2	43	7.9	33.2	46.7
Arasan SF	75	"	3	44	8.1	34.9	43.4
" "	"	75	2.2	41	9.2	40.5	48.6
Check	—	—	—	38	39.6	69.9	85.4
Least difference necessary for significance (5% level)					6.3	7.9	6.8

[a] Based on a seeding rate of 4 lbs. per acre.



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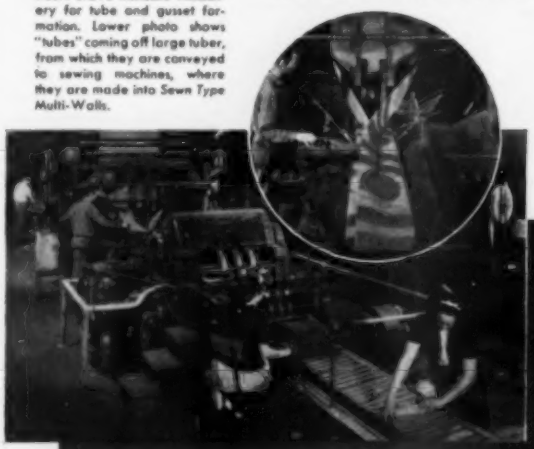

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ground grade of technical thiram for these tests) and "Arasan SF" (75% thiram, wettable). The fungicides were stuck to the seed with a 5% solution of 15 centipoise "Methocel" containing 10% glycerin. The quality of sticker used (given in Table 1) was determined on the basis of the dosage level and comparative wettability of the fungicide. The seed in a one-liter flask was moistened with the sticker and stirred with a narrow wooden paddle until each seed was completely wetted. Then the required amount of fungicide was added and the whole stirred with the paddle for two minutes. The flask was then shaken and rolled until the pellets separated. The seed-fungicide mass was stirred for one-half minute with the paddle to break up any seed clumps and again shaken until all the fungicide had been taken up by the seed and formed into pellets. The treated seed was allowed to dry at 65° to 75° F. for at least 24 hours before sowing.

Four replicate plots were used for each treatment. Seeds of Early Prolific Straightneck squash were planted on July 20. The sprays were applied with 3-gallon knapsack sprayers at rates of approximately 100 gallons per acre per application, on August 24 and 28, September 2, 6, 11, 15, 19, 22, 27, October 3, 7. Scab infection was first noted on both leaves and fruits late in August and developed slowly until mid-September when rains favored its more rapid development and spread.

The following materials were supplied by the manufacturers: "Cuprocide" (83% cuprous oxide) by Rohm and Haas Co., "Actidione" (cycloheximide) by the Upjohn Co., tribasic copper sulfate (53% copper) by Tennessee Corporation, "Crag Potato Fungicide 658" (copper zinc chromate — 30% copper, 20% zinc, 10% chromium) by Carbide and Carbon Chemicals Corporation; "Parzate" (65% zineb) by E. I. DuPont de Nemours & Co., Inc.

Only zineb showed much promise against scab. Certain other materials appeared to reduce scab incidence on a percentage basis, but zineb was the only material that resulted in significant yield increases. Furthermore, for the last three pickings, when scab was most severe, the percentage of scabbed fruit on zineb-treated plots was significantly less than for any other treatment. Cycloheximide, which has been reported elsewhere as showing promise against scab on cucumbers, was relatively ineffective against squash scab in this test. However, it was very effective against powdery mildew. Cuprous oxide plus cotton-seed oil was also apparently very effective against the squash powdery mildew, but was noticeably phytotoxic.

Emergence tests were run on two different lots of seed — harvested in 1946 and in 1949 — sown in soil and in sand flats. Sixty seeds from each treatment were planted in each non-replicated row. The 1949 seed was placed in furrows lined with "fibre-spun" paper so that the near-maximum phtytotoxic effect of the fungicide would be obtained. The soil and sand, which had been steam-pasteurized, were kept moderately wet but not saturated and at temperatures of 55° and 57° F. after seeding. Stand counts were made at approximately three-day intervals over a period of four weeks after initial emergence.

Pelleted seed was sown in the

(*Turn to Page* 107)

Fungicides on Squash

D. E. ELLIS of the North Carolina Agricultural Experiment Station reports results of experiments conducted with his colleagues C. E. Lewis, R. G. Owens, and H. C. Fink, primarily for the control of scab, caused by the fungus *Cladosporium cucumerinum*, of summer squash. This disease for several years has been a limiting factor in the production of this crop in the mountain area of the State. It has not been especially troublesome in early plantings harvested in midsummer, but has been very serious in late plantings which are often desirable because of the usually higher market prices prevailing later. In 1949, several late plantings in Henderson County were total losses due primarily to scab.

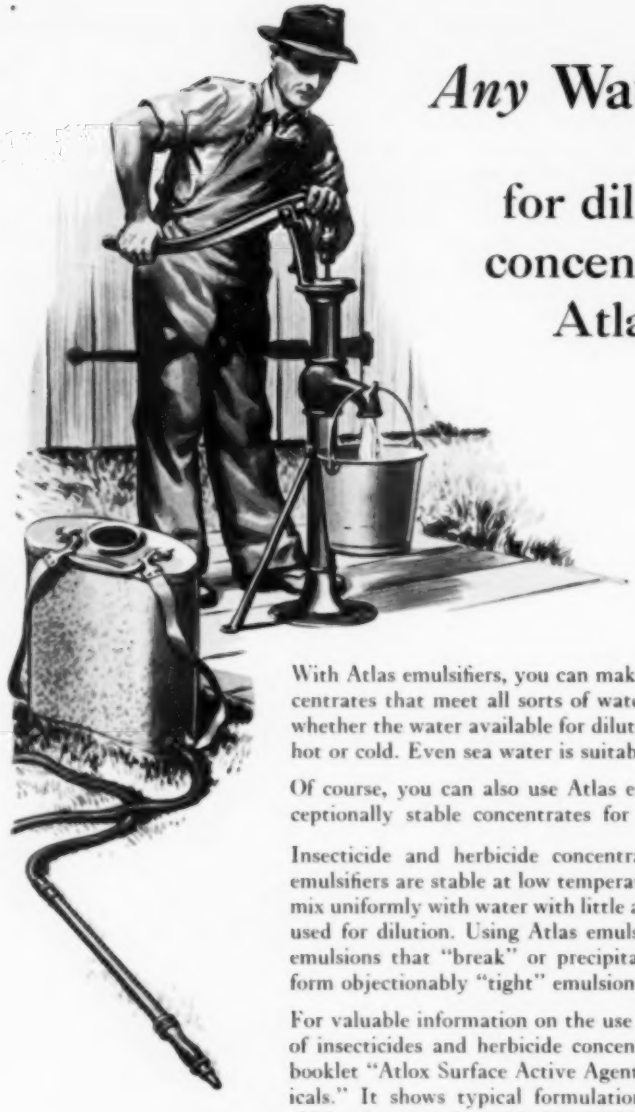
Results of a preliminary fungicidal spray test at the Mountain Vegetable and Fruit Station at Hendersonville, in 1950, are given in Table 3. Scab was less severe than in 1949, but it developed rather abundantly late in the season, as did powdery mildew caused by the fungus *Erysiphe cichoracearum*.

Table 3

Effect of fungicides upon yield of summer squash and incidence of scab and powdery mildew, North Carolina Tests.

Treatment	Yields of marketable squash (bushels per acre)		Scabbed fruit (percent)		Powdery mildew* (Index of severity)
Materials and concentration	Entire Season	last 3 pickings	Entire Season	last 3 pickings	October 3, 1950
Cuprocide 1-100 + cotton-seed-oil (1gal./100 gal.)	267	56	8.2‡	21.8†	0.0
Cotton-seed-oil 1 gal./100 gal.	281	67	15.5	28.9	1.5
Actidione 10 p.p.m.	286	52	12.6	30.7	0.0
Tribasic copper sulfate 2-100	291	56	7.8‡	20.0†	0.7
Crag Potato Fungicide 658 2-100	323	65	11.2†	33.7	0.7
Parzate 2-100	390‡	95‡	1.9‡	5.0‡	0.7
Nontreated (Check)	277	53	18.7	35.8	2.5
Least difference for significance at 5%	58.1	20.5	7.0	12.3	—
Least difference for significance at 1%	79.6	28.1	9.6	16.9	—

* 0= no mildew; 1= slight; 2= moderate; 3= severe mildew infection.
† Significantly different from nontreated check.
‡ Highly significantly different from nontreated check.



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Insect Infestations Getting Under Way

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Dr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

THE winter just passed, the coldest since 1899 in the sugarcane section of Louisiana, had a considerable effect on survival of the sugarcane borer, according to E. K. Bynum, W. E. Haley, and J. W. Ingram of the Bureau of Entomology and Plant Quarantine. These workers point out that usually about 90 percent of the sugarcane borers that survive the winter do so in millable stalks or millable sections of the tops that are left in the cane fields during harvest and in the shoots which grow from cane that was planted the previous summer. Stalks and large pieces of cane left in the field serve as the chief source of the spring infestation, since the acreage of summer-planted cane is limited.

Examinations made during February in 26 fields of summer-planted cane disclosed an average survival of 76 borers per acre. The survival this year is only about one-twentieth of the average number of borers (1,381) from summer-planted cane that survived the winter annually during the period 1944-50. Examination of all borers found in samples of summer-planted cane in February 1951 indicated a winter mortality of 90 percent.

A total of 72 fields were also examined during February to determine the status of borers overwintering in sugarcane trash. Only 4 borers per acre were found, which is the lowest survival on record for borers overwintering in trash left on the fields after harvesting. The records indicated a mortality of at least 95 percent for borers overwintering in trash.

On the basis of the data obtained, these investigators are of the opinion that the first-generation of sugarcane borers in April and May of this year may be one of the lightest on record, and it appears doubtful that the borer population can build up sufficiently to cause much damage in Louisiana this year. Growers are being urged, however, to be on the watch for infestations that may develop, especially in summer-planted cane. Local infestations may be sufficient to warrant treatment.

Recommendations prepared jointly by A. L. Dugas and C. E. Smith, of the Louisiana Agricultural Experiment Station, and J. W. Ingram and E. K. Bynum, of the Bureau of Entomology and Plant Quarantine, for control of the sugarcane borer in Louisiana in 1951 suggest dusting with cryolite or ryania. Cryolite should be used undiluted, and ryania at 40 percent strength. Over a number of years cryolite has given somewhat better results than ryania for control of first-generation borers, but 40 percent ryania has been slightly more effective than cryolite against the second generation. Infestations of the yellow sugarcane aphid have not built up following extensive dusting with ryania for control of second-generation borers as has happened in many instances after treatment with cryolite.

Dusting for control of first-generation borers is usually started about the middle of April, and for second-generation about the middle of June. It is seldom necessary to dust the same field for both generations. First-generation dusting is recommended for control of borers on a plantation scale since it gives a higher kill, prevents increase and spread of the borers into adjoining areas, and is less likely to cause a build-up of infestation by the yellow sugarcane aphid. All cane acreage known to be sufficiently infested should be treated for first-generation borers.

The recommendations call for dusting to start as soon as eggs appear in large numbers and for 4 applications to be made at weekly intervals. The dust should be applied at the rate of about 10 pounds per acre, while the air is quiet and the plants are wet with dew. Applications may be by airplane, power dusting machine, or rotary hand gun, depending upon the size of the area to be treated. The cost of dusting for either generation with either cryolite or ryania is estimated at about $7.50 to $8.00 per acre.

The above-mentioned workers point out that while sprays have

shown some promise against the sugarcane borer, they have not yet been thoroughly tested and are not recommended. Benzene hexachloride, DDT, chlordane, toxaphene, and parathion are also not recommended for control of this pest.

The Screw-Worm Situation

RESULTS of screw-worm surveys conducted during 1950 and early 1951 have now been summarized. According to W. G. Bruce, of the Bureau of Entomoloy and Plant Quarantine's laboratory at Savannah, Georgia, infestations of this insect were reported during 1950 from a larger area in the Southeast than during 1949. The overwintering area in that part of the country is usually confined to penninsular Florida. However, the mild winter of 1949-50 permitted screw-worms to survive in all of Florida, in all except the mountainous northwestern part of Georgia, in the southeastern two-thirds of Alabama, in Mississippi as far north as Columbus, in all of South Carolina except about 10 counties in the northwest part of the State, and in about 12 counties in southeastern North Carolina. The early migration of screw-worms from this large, unprecedented overwintering area resulted in widespead infestations last year. The northern boundary of the infested area in 1950 extended from southeastern Virginia, southwest through Tennessee and northern Mississippi, with a few scattered cases in Kentucky and western Tennessee. Infestations were especially heavy in Florida, Georgia, Alabama, South Carolina, and southwestern Mississippi. High populations of screw-worms persisted until November 24, 1950, when a severe cold wave enveloped the Southeast and subnormal temperatures continued to the end of the year. The prolonged cold weather during the winter of 1950-51 eliminated the screw-worm from all of the southeastern States except the southern half of Florida, in a line extending from Tampa, through Lakeland, and to Cocoa on the east coast.

In the Southwest, according to E. W. Laake, of the Bureau's Kerrville, Texas laboratory, screw-worms survived the winter of 1949-50 in a much greater area than during any previous year since the survey was started in 1945. The overwintering area in Texas extended 300 miles farther north and 200 miles farther northwest than during any previous winter since 1943. The fly survived the winter of 1949-50 in an area extending approximately from the vicinity of Houston, Texas to Imperial and Riverside Counties, California. Before the end of the 1950 season the screw-worm fly had spread to the states of Oklahoma, Kansas, Nebraska, South Dakota, Iowa, Minnesota, Illinois, Indiana, Missouri, Arkansas, and Louisiana. Heavier than normal infestations were reported from Kansas, particularly in the southern half of the State, and from Louisiana and Texas. The infestations in Missouri, Indiana, Illinois, Iowa, South Dakota, and Nebraska, and probably most of those in Kansas, were all due to the importation of southern animals infested with screw-worms.

The survey indicated that in the southwest the screw-worm survived the winter of 1950-51 only in the southernmost part of Texas and in a small area in southwestern California and southwestern Arizona.

All of the Texas counties in which the fly survived the winter contain communities in which winter vegetables are produced under irrigation. This situation appears to have provided favorable overwintering environments for the fly, because in adjacent counties in the same area where there was no irrigation the fly disappeared during the past winter. In Arizona, the fly was observed this winter only in the irrigated Valley of Yuma County. In California, it was found to have survived the winter only in Imperial County and in at least the eastern half of Riverside County. Although the western areas in which this insect survived the winter are much smaller than usual, there is no reason to believe that the screw-worm will not spread to all of the usually affected states during 1951 when it migrates northward of its own accord and through the transportation of infested animals.

The areas infested by the screw-worm in 1950, and the northern limits of the areas in which this insect survived the winters of 1949-50 and 1950-51 are shown on the accompanying map. (See Pg. 63.)

Screw-worm remedies, particularly the Bureau of Entomology and Plant Quarantine's EQ 62, were used extensively in many areas during 1950 for preventing infestation of wounds, especially those caused from branding, marking, and dehorning. The Bureau's new screw-worm remedy, EQ 335, became available for use by livestock owners in Texas near the end of the season.★★

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More on Sulfur Situation

Department of the Interior officials believe that the United States can pull through the sulfur shortage by exhaustive development of all potential sources, it has been reported. However, these officials feel discouraged about finding any large new deposits in the Gulf area where the present rich supply is being depleted. Smaller domes in the region will make up for the depletion from the larger sources.

In view of the shortage, Department of the Interior officials and sulfur company engineers are looking to other possible marginal supplies such as pyrites, smelter gases, neglected surface deposits and anhydrite, and more emphasis will be placed on these sources. American pyrites are found in Tennessee in considerable quantities and production of sulfuric acid from this source has been neglected in the past because of high costs of production and low cost and availability of native sulfur.

Recovery of sulfur from smelter gases has been rising each year and more emphasis will be placed on this source. However, the chief difficulty lies in the fact that smelters are usually in regions that have a low demand for sulfuric acid and long distance shipping is not profitable.

Although several years may elapse before all possible sources of sulfur may be exploited, it is thought that in the long run they will probably make up the deficit.

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Scientists Deny that "DDT Causes Human Disease" as

Delaney Hearing Resumes

IMPORTANT testimony relative to the toxicity of DDT to humans was presented before the Delaney Committee in Washington, April 17th as the Committee resumed its hearings investigating the use of chemicals in food products. The testimony, offered by Drs. Paul A. Neal and Wayland J. Hayes, Jr., contradicted in many details testimony presented to the committee last November by Dr. Morton S. Biskind who charged that the widespread use of DDT insecticides has been responsible for many cases of DDT poisoning. Dr. Biskind attributed responsibility to DDT for many cases of heart disease, anemia, liver ailments, skin sensitization, etc.

Drs. Neal and Hayes, however, in commenting on the cases reported by Biskind, said "it is justifiable to question whether any of the cases reported by him are clearly and unequivocally attributed to DDT toxicity per se .... There are at present no authentic cases of chronic DDT poisoning of human beings in the literature where careful scientific data accompany the report". They suggest that the cases of supposed DDT poisoning reported by Dr. Biskind "are quite consistent with certain types of psychneurosis, particularly hysteria."

Drs. Neal and Hayes emphasized that "DDT is a toxic substance and can cause injury if not properly handled. Undisputed cases of acute illness have been reported. It is also true that there are accurate reports of the presence of DDT in the body fat and milk of human beings. There is, however", they repeat, "no authentic report of liver injury or other chronic poisoning in man resulting from DDT".

Reviewing the history of test work on the toxicity of DDT, they noted that before DDT was released by the government for general public use, a number of experiments were made on volunteer human subjects at the National Institute of Health. Two subjects were exposed in a small sealed chamber to DDT dispersed as an aerosol. In spite of the fact that their torsos were heavily covered with DDT at the conclusion of the various experiments, and the exposures were ten times as severe as would result from household use of a single aerosol bomb, "there were no subjective or objective symptoms referable to DDT". In a further test single doses as large as 770 mg. of DDT in olive oil were taken by one of the test subjects without causing any ill effects. In studies reported by Stammers and Whitfield (Nature (Lond.) *157*, 658, 1946) 15 men who had been engaged continually for 7 to 9 months in spraying enclosed areas with a 5% solution of DDT in kerosene were examined. No ill effects were noted. Similar negative findings were reported by Gordon (Brit. J. Indust. Med., 3, 245, 1947) after examining 27 African workers who had been engaged in spraying DDT for a period of six months.

Drs. Neal and Hayes reported further that since 1945, when DDT was first released for general civilian use all suspected cases of DDT poisoning brought to the attention of certain government agencies or reported in the press were referred to the National Institute of Health for study, 40 cases in all of suspected DDT poisoning being investigated before this activity was terminated in November, 1947. "Not a single case of DDT poisoning was found among these patients . . . some of the patients reportedly suffering from DDT poisoning were found to have had no known contact with DDT. In some cases there was skin and mucous membrane irritations due to the solvents used for the DDT, but in other patients the condition incorrectly ascribed to DDT was shown to be a well known organic disease, such as bleeding peptic ulcer, coronary thrombosis, etc. To the best of our knowledge, there have been no substantiated cases of DDT poisoning in this country resulting from DDT as a residue."

Drs. Neal and Hayes reported a number of authenticated cases from the medical literature on the acute toxicity of DDT. There have been, they report, approximately 200 cases of acute DDT poisoning after its accidental ingestion, commonly where DDT in powdered form was mistaken for flour, and tremendous dosages were taken as compared with the small quantities which might result from ingestion of residues on foods. Studies of these cases indicated that a relatively large amount of DDT is necessary to produce acute human illness. In cases where the DDT was dissolved in organic solutions, investigation demonstrated that it was probable that the factor responsible for the toxicity was the organic solution.

Referring specifically to their comments on Dr. Biskind's prior testimony, and to the possible scientific or clinical basis for this testimony, they emphasized that the clinical manifestations used by Dr. Biskind as an indication of DDT poisoning were based on only a single British report, which was not confirmed by more careful and more thorough experimentation. They point out that in both animal experimentation and

controlled studies by other scientists on human volunteers, doses of DDT thousands of times those presumably encountered by Dr. Biskind's patients produced none of the symptoms reported by him. Dr. Biskind's testimony, they observe, "gives the impression that he accepted his patient's statements about their exposure to DDT and if no mention was made of it he specifically questioned them about it."

They add further that many of Dr. Biskind's patients had been seen prior to his examination of them by other physicians who made no such diagnosis of DDT poisoning as did Dr. Biskind. According to Dr. Biskind, approximately one-third of his patients showed symptoms of DDT poisoning. "If that large a percentage of his patients were afflicted with DDT poisoning," Drs. Neal and Hayes observe, "one might assume that similar cases would show up in the medical practice of other physicians and be recognized by them as such".

Reconvenes May 1

A RESUMPTION of the hearing on May 1, brought strong testimony to the effect that efforts to control injurious insects must be continuous and "can never be relinquished", and that any contemplated legislation must not create obstacles in the way of industry's technological research. The witnesses, both appearing on May 1, were Dr. Frank Princi, College of Medicine, University of Cincinnati and Dr. Charles E. Palm, head of the Department of Entomology, Cornell University, Ithaca, N. Y. Also scheduled to be heard on May 1 but postponed to the following day, was Dr. George C. Decker, Illinois Natural History Survey and Illinois Agricultural Experiment Station, Urbana, Ill.

Appearing first before the committee was Dr. Princi who testified on physiologic research on the toxicity of pesticides. He pointed out the wide differences of opinion regarding various insecticides, ranging from the view that "Everything is toxic" to "Everything is safe" to use.

In view of the complexity of problems involved in arriving at decisions on whether or not additional legislation is necessary, Dr. Princi suggested that an advisory board composed of representatives of manufacturers, government and the public as well as experts in the fields of medical and biological research might be in the public interest. He added that in addition, any proposed legislation might well emphasize the inter-agency approach on the part of the government to these problems of toxicity. "In this fashion, we would be less likely to see the opinions of one agency of government promulgated as fact when they are in direct contradiction to the opinions of another", he declared.

Continuing on this theme, the witness pointed out that "mere abundance of scientific investigation is not sufficient to satisfy the demands for accurate information". Using DDT as an example, he declared that this insecticide has been subjected to more scientific investigation than any other organic material. Yet, despite this knowledge, there is still sharp disagreement concerning the hazard associated with its use. On one hand DDT is described as "the safest of insecticides" while others suggest that it is probably responsible for conditions such as suicidal tendencies, aplastic anemia, pneumonia, leukemia, virus X, arteriosclerosis and even cancer.

"Much of this controversy", he said, "has developed because of attempts to translate the results of animal experimentation into human experience without appropriate consideration of the variability of animal species. Other diversities of opinion have developed because of a lack of understanding of the actual conditions of exposure which result from ordinary methods of use of the material. It is suggested that these questions cannot be resolved fairly and adequately by any single governmental agency."

The witness continued by observing that animal experimentation alone does not hold the answer to the question of safety. Only human experience under carefully controlled conditions of exposure and observation can answer the question of human safety, he emphasized, but if a substance has been shown to be safe under unusual conditions of use, it should be regarded as safe under less serious circumstances of exposure. However, if animal experimentation suggests certain hidden effects, these must be investigated carefully in terms of human beings.

Dr. Princi warned against the rendering of arbitrary decisions based on the interpretations of any single group of investigators, pointing out that such may be subject to the prejudices, emotions and personal experiences of the particular persons or group. He warned further, against allowing any contemplated legislation to set up "unsurmountable obstacles" to the realization of industry of the fruits of its developmental research, since thereby the incentive for technological progress may be reduced or stifled. He concluded by declaring that "it would be a distinct disservice to national security in these unsettled times for Congress to take any action (not warranted by overwhelming evidence) which might in any way prejudice the research potential of the United States."

Entomology Outlined

DR. Palm gave members of the committee a practical short course in entomology in presenting his paper. He pointed out that "upward of one million" different kinds of insects are already described in the world, some of which are injurious and others beneficial to man. He reminded that injurious insects produce large numbers within a short time under favorable conditions. Thus, the fight against these pests is never-ending, and for this reason, agricultural experiment stations, state, federal and industrial, are working for safe and efficient insect control for both the present and the future.

The Cornell entomologist then reviewed some of the history of pesticides, pointing out that modern control measures have been made possible through the teamwork of in-

dustry, scientists of both government and industry and the farmer who handles the actual job of control. Even with this teamwork, estimates of current losses from insects in the U. S. have been placed at about $4,000,000,000 annually.

Responsibilities of the entomologist make him conscious of the need for determining a program of safe use of these chemicals concerning their application as well as keeping possible residues at a safe minimum. The entomologist must be concerned with the tolerance of plants and animals so neither crops nor livestock may be harmed, and he must also consider possible accumulation of pesticides in the soil as well as their tendency in some cases to cause off-flavor in treated commodities.

Because of the wide scope of necessary information demanded for solution to all these problems, the entomologist needs and receives the assistance of toxicologists, chemists, pharmacologists, physiologists, public health officials, and agencies of government responsible for the regulation of insecticidal use. The determination that a given chemical will kill insects is only the starting point in finding whether it will be a suitable insecticide. Research is shortening the time required to get an answer, yet, an expanded and intensified research program is needed to get at many fundamental problems involved in the use of insecticides. "Every legitimate support must be given to expand the facilities and personnel needed to conduct this research in government and in private laboratories", he declared.

The necessity for having a broad selection of insecticides was brought out by Dr. Palm who told the Committee that problems of supplies, climatic conditions, variations in crop practices, and insect distribution determine the materials to be used, and great flexibility is needed. This emphasizes the need for developing new products.

The witness also brought up the problem of flies and other insects which are developing resistance to DDT and other insecticides. At this point the committee asked for a further explanation of this phenomenon on which Dr. Palm described in detail. Research is being conducted as fast as possible to find the reasons for this action, he said, and more will of course be known about it later. At any rate, it does point up again the necessity for having alternate pesticides to counter the tendency toward development of resistance.

Decker Testifies

APPEARING before the Committee on May 2 as the lone witness of the morning, Dr. George C. Decker told the Congressmen that the public is being well-protected by existing legislation in the form of the Federal Insecticide, Fungicide and Rodenticide Act of 1947 which requires all pesticides to be registered with the U.S.D.A. before entering interstate commerce. And before that, the producer must present his labels for review and establish all claims satisfactorily. He reminded further that the label must bear adequate caution or warning statements, directions for use and additional information to afford adequate protection for the public.

Although this act has been operating for only a short time, "It has done more than any other single piece of legislation to properly regulate and control the sale, distribution and use of pesticides. Unreliable and hazardous products have been driven out of existence. The agricultural chemical industry is now practically free of the . . . questionable cure-all type of product that still plagues the drug trade", he told the Committee.

The Illinois entomologist in his prepared statement (full text of which is to appear in the June issue of *Agricultural Chemicals,*) reiterated the necessity for using pesticides, calling attention to the fact that fruit, vegetables, and many other staple crops cannot be produced economically, efficiently nor in adequate quantities without chemical protection from insects, plant diseases, weeds and other pests. "To deny agriculture the use of these chemical tools would be to jeopardize our agricultural economy and an adequate, well-balanced food supply for the American public", he declared.

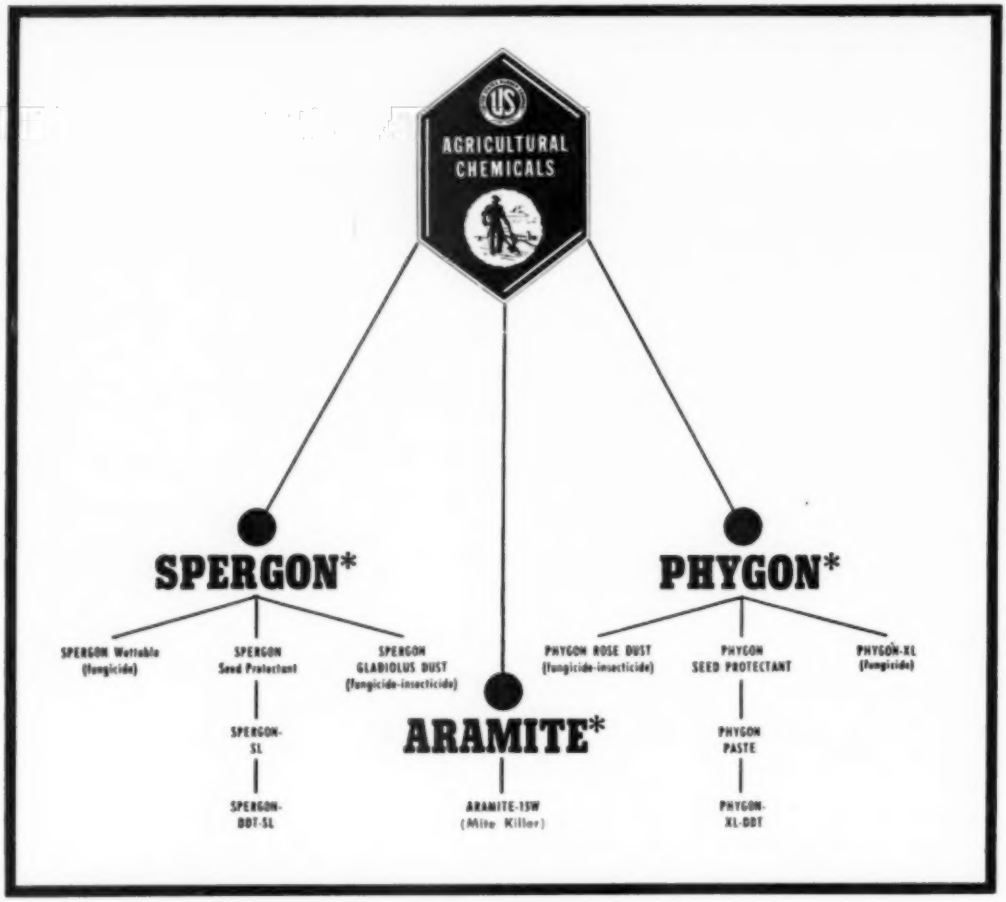
Need for a wide choice of pesticides was likewise emphasized, the witness drawing a parallel with the physician and pharmacist who require a wide assortment of pharmaceuticals to cover specific cases. "To argue that the agriculturist should be drastically limited in his choice of material, would be tantamount to saying that the physician and the veterinarian should be limited to the use of sulfur, spirits of ammonia and herbs, and should be denied the use of sulfa drugs and the new antibiotics." Dr. Decker said.

Regarding hazards involved in the use of pesticides, he stated that one must differentiate between use or occupational hazards and those concerned with food contamination. Users must be fully informed about potential dangers, and thus take safety precautions. Food hazards, on the other hand, are closely related to the chronic toxicity of the chemical used and may be measured in terms of the amount of residue remaining on or in food reaching the consumer.

Following the presentation of Dr. Decker's prepared statement, he was cross-examined by the Committee's counsel, V. A. Kleinfeld and by members of the Committee itself.

Dr. Decker was asked if some insecticides were capable of imparting off-flavor to certain crops and if so, what can be done about it. He replied that this had happened with BHC, but the matter is self-correcting since growers now know when and how to use the material to avoid such incidents. The witness also reminded that this is not a public health hazard, but rather a problem of economics since it involves marketing and public acceptance.

In replying to further questioning, Dr. Decker pointed out that standards of quality of fruits and vegetables on the market have been rising constantly for years, and the public simply will not tolerate wormy, gnarled and scabby produce as it once did. Only a few years ago, he reminded, apple-eaters were accustomed to finding worms in the fruit.



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INDUSTRY NEWS

HAROLD R. DINGES

CLAUDE J. BYRD

Spencer Ups Byrd, Dinges

In a series of promotions within the sales division of Spencer Chemical Company, Kansas City, Mo., Harold R. Dinges has been named director, product sales; W. W. Hutto, sales manager, refrigeration products; William Schopflin, sales manager, industrial chemicals; and Claude J. Byrd, sales manager, agricultural chemicals.

Mr. Dinges joined Spencer early in 1947, coming from the Mathieson Chemical Company. The three other executives entered the organization in 1946. Mr. Hutto previously operated his own dry ice distribution business. Mr. Schopflin joined directly following his discharge from the Army, after pre-war service in the sales department of Thompson-Hayward Chemical Company. Mr. Byrd brought with him some twenty years' experience in agricultural chemicals, with assignments as a county agent, as a Department of Agriculture official and as a sales representative with American Cyanamid Co.

The Spencer sales division is headed by John R. Riley, Jr., vice-president in charge of sales, and Joe E. Culpepper, general sales manager.

New Stauffer Pesticide

Stauffer Chemical Company has announced its new pesticide, "Sulphenone," has been accepted for use in 1951 on certain orchard crops by the U. S. Dept. of Agriculture and a number of Western states for interstate and local sale.

"Sulphenone 40W," a recent product of Stauffer research, is effective for control of the species of spider mites infesting agricultural crops. It is one of the least specific of any acaricides.

One of the properties of "Sulphenone" is said to be its low mammalian toxicity.

New CFA Secretary Named

Elmer S. Nelson, executive secretary of the California Fertilizer Association, Los Angeles, has resigned, the CFA has announced. Succeeding Mr. Nelson is Sidney H. Bierly, formerly associated with the California State Chamber of Commerce. The appointment was effective as of April 30, 1951.

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Meetings Scheduled

The American Society for Horticultural Science will meet September 5-7 in Minneapolis and the Pacific Northwest Plant Food Association will meet June 27-29 at Corvallis, Oregon.

NAC Committee to Rutgers

Rutgers University (State University of New Jersey), New Brunswick, N. J., has invited the Information Committee of the National Agricultural Chemicals Association to hold a two-day meeting on its campus May 23 and 24, in order to show the committee members the workings of both the University and the New Jersey Agricultural Experiment Station. William H. Martin, Dean of the Agricultural College and Director of the Experiment Station will be in charge of the sessions, assisted by Wallace S. Moreland and VanWie Ingham.

Chairman of the Information Committee is Carlos Kampmeier, Rohm & Haas Co., Philadelphia. The group will be taken on a tour of inspection of both laboratories and field, and will hear talks by Experiment Station scientists and others connected with both the University and the Station.

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Connelly Returns to Army

Al Connelly, General Chemical Division of Allied Chemical & Dye Corp., Birmingham, Ala., has recently been called back into the armed services. He has been on inactive duty as a captain since World War II when he was a B-29 pilot stationed on Guam. He was ordered to report to Randolph Field May 25th, to regain his proficiency in handling the B-29 bomber.

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Fertilizer Plant Planned . .

The American Agricultural Chemical Co., New York has announced plans to erect a new fertilizer plant and in preparation for construction has purchased a forty acre tract of land east of Saginaw, Michigan. Construction is expected to begin in the near future and completion is expected around January, 1952.

Japanese Export Fertilizer

As many as 50,000 tons of ammonium sulfate fertilizer are expected to be exported from Japan to South Korea and Formosa in the near future, trade reports from Osaka indicate. Higher production of the material in Japan has made possible the export program.

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New Booklet Released

Buffalo Electro-Chemical Co., Buffalo, N. Y., has issued a 21-page booklet describing uses of peracetic acid as a fungicide and bactericide. Known as Becco peracetic acid, the booklet gives details on uses and applications of the acid.

According to the company the acid is one of the newer bactericide-fungicides with novel features recommending its utilization as a germicidal wash for fruits and vegetables. The company states that Becco peracetic acid is a low-cost, non-residual, freely soluble, and is a powerful germicide. The solution is colorless and readily diluted with water.

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Reader Points Out Error

Calton O. Cartwright, Assistant County Agricultural Agent in Massachusetts spotted "a glaring error on page 96 in the pear psylla article" of our March issue. It was stated that "parathion used at the rate of one hundred pounds of a 15 per cent wettable powder in 100 gallons of water looked promising as an early spring application". As Mr. Cartwright noted, it should read one pound of parathion to 100 gallons of water.

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Releases New Bulletin

Sturtevant Mill Co., Dorchester, Mass., has released a new bulletin describing their den and excavator, a complete unit for producing a super phosphate as a fertilizer. The pamphlet covers specifications, uses and has a diagram of the unit.

Named Monsanto Head

CHARLES A. THOMAS

Charles A. Thomas was recently named president of Monsanto Chemical Co., St. Louis, Mo. He succeeds William M. Rand who retired under the company's pension plan. Dr. Thomas has been executive vice-president of Monsanto since 1947. He is a graduate of Transylvania College and Massachusetts Institute of Technology, and began his chemical career with General Motors Corp.

The new president became associated with Monsanto when it acquired the Thomas & Hochwalt Laboratories, Dayton, Ohio, in 1936. Dr. Thomas became central research director, and a member of the company's board of directors six years later.

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Burlap Shortage Acute

American farmers and packers using burlap bags to ship their products are confronted with a serious packing problem in view of the burlap shortage. Where possible, normal burlap users have resorted to paper and cotton containers, making these also hard to get.

The burlap shortage is due in part to price controls and the disturbed political and economic situation in India, principal burlap producing area. An additional strain on the market is the use of large quantities of burlap bags by the U.S. Government for sandbags and for packing military gear, plus the use of burlap in covering farm and factory goods. Whereas normal government use of burlap is about 800 million yards annually, the estimate for the present year is about one billion yards.

Almost all burlap is imported from India, where it is woven from jute, a fiber grown in Pakistan. Political and currency disputes interfered with the flow of jute, contributing to export difficulties. As these differences were settled, India lifted price controls on burlap, so that prices skyrocketed to an extent that U.S. importers have all but ceased buying Indian burlap. One grade of burlap, which previously sold for about 23 cents a yard in India, now is priced at 34 cents, which is about two cents higher than the legal maximum in this country. American buyers are apparently waiting for a drop in Indian prices and a raising of U.S. ceilings.

Current prices of burlap bags in the United States are at top range. A burlap potato sack, worth about 14 cents at Chicago before Korea, now brings 30 to 35 cents. In the same period, cotton sacks have increased in price from $260 per thousand to $400 per thousand, while heavy paper bags are worth seven cents, against the pre-Korea price of two cents.

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Becomes CSC Director

Commercial Solvents Corp., New York, has named Brownlee O. Currey as a member of its board of directors, the corporation has announced. The new director is president and a director of Equitable Securities Corp., Nashville, Tenn., and serves as a director for a number of other firms in other sections of the county.

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Bemis Makes Dalldorf S.M.

A. C. Ewer, manager of the Bemis Bro. Bag Co. plant at Brooklyn, New York has announced the appointment of A. E. Dalldorf as sales manager. Mr. Dalldorf started with the company in 1936 as a stock clerk. In 1944 he was made a sales correspondent, and in 1946 became a salesman. After transfer to Philadelphia from 1947 to 1950, Mr. Dalldorf returned to Brooklyn where he was given his recent promotion.

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McGrevy to Chemical Mfg.

John V. McGrevy, secretary of Merchants Chemical Co., Inc., has resigned from the company, effective April 23, 1951, to take the position of vice president, Chemical Manufacturing Co., Inc., 21 West St., New York 4, N. Y.

Adams Joins BPISAE

J. Richard Adams, director of technical services for Spencer Chemical Company, Kansas City, Mo., has announced his resignation, effective May 1, to take up duties with the Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Fertilizer and Agricultural Lime, in Washington, D.C. Mr. Adams was connected with the U. S. Department of Agriculture for some 20 years before taking his post with Spencer in August of 1946.

As Director of Technical Services for Spencer, he set up a customer service program and was responsible for descriptive literature on the company's industrial and agricultural products.

In his Washington assignment, he will engage in all phases of the Division's activities, with special reference to studies of fertilizer production, supplies and consumption.

Mr. Adams will be succeeded at Spencer by Joe C. Sharp, who will become manager of technical services.

•

Richardson Goodrich V.P.

William S. Richardson, president, B. F. Goodrich Chemical Company of Cleveland has been elected a vice president of the B. F. Goodrich Company, it was announced recently by John L. Collyer, chairman of the board and president. Mr. Richardson will continue as president of the chemical company, a division of The B. F. Goodrich Company.

•

Lion Names McKenna

Jack McKenna has been named safety director of Lion Oil Company, John W. B. Foringer, director of Industrial Relations has announced. Mr. McKenna has served as assistant safety director since 1948 and has been acting safety director since the death of J. R. Gordon who headed the company's safety activities for nearly 10 years.

•

Offers Chlordane Streamer

Velsicol Corp., Chicago, has offered the trade a window streamer to be displayed by distributors and dealers who handle chlordane. The three-color streamer says "Chlordane controls the Wireworm", shows a picture of the worm, and has a small Velsicol trade mark in the corner.

•

Cyanamid Builds in L.A.

American Cyanamid Co., New York, has announced the imminent construction of a 64,000 square foot building for offices and warehouse facilities, in Los Aneles. The building is expected to be completed by September 1, 1951, the company says.

Spencer Plant Operating

Spencer Chemical Company, Kansas City, Missouri, has announced the completion and successful first month's operation of the world's largest ammonium nitrate prilling plant. Though only one of the two 185-foot towers has been put into production, the second tower is expected to be completed by August. The anticipated capacity after that date is for more than 1,000 tons of prilled material per day.

WM. E. EVANS, JR.

To Atlanta for C. S. C.

William E. Evans, Jr. has been transferred by the Agricultural Division of Commercial Solvents Corporation from Terre Haute, Ind. to Atlanta, Georgia. Mr. Evans will handle the company's expanding sales of feed supplements, insecticides, and fertilizer throughout the South.

•

Joins Chem. Construction

Brigadier General Edward Montgomery, U.S. Army, Retired, has been appointed assistant to the executive vice president of Chemical Construction Corporation, New York. His duties will include the coordination of the work of the several departments of the company. General Montgomery retired from the army in 1949 after twenty-three years duty with the Chemical Corps. He was technical director in charge of Chemical Warfare Research and Development during the years 1931 and 1935.

•

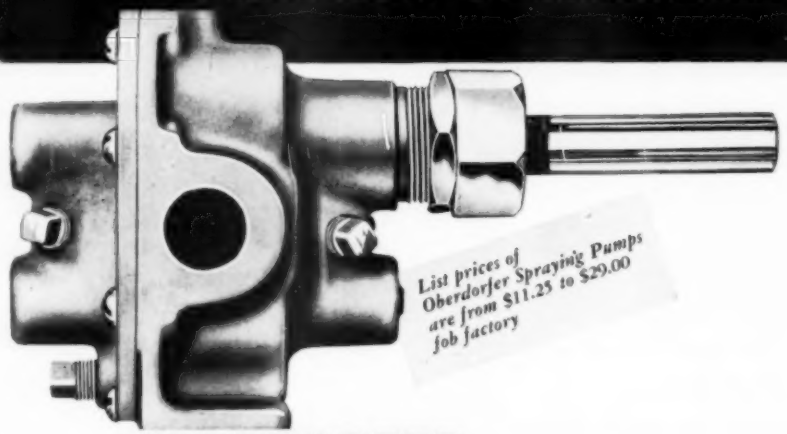
Ludington Chase Asst. V.P.

At a recent meeting of Chase Bag Company's board of directors, F. H. Ludington, Jr., was made assistant vice president of the firm. Mr. Ludington, an engineer graduate from Princeton University and former naval egineering officer, was serving in a managerial capacity at the company's Philadelphia branch when appointed to his new position.

His new headquarters will be in the Chase executive offices in New York City, where he will assist C. S. Sheldon, vice president.

Costly HIGH PRESSURE SPRAYING CAN NOW BE ELIMINATED

COTTON
CORN
TOBACCO
CABBAGE
RICE
OATS
PEAS
FLAX
TEA
HOGS
BEANS
GRASS
WHEAT
POTATOES
CATTLE
GRAPES
ONIONS
ORANGES
BANANAS
SHEEP
CHERRIES
LEMONS
CARROTS
PEACHES
PLUMS
RYE
PRUNES
BERRIES
ALFALFA
BARLEY
SUGAR CANE
APPLES
SUGAR BEETS
SORGHUM
PINEAPPLE
SOY BEANS



List prices of Oberdorfer Spraying Pumps are from $11.25 to $29.00 f.o.b. factory

OBERDORFER Low Pressure BRONZE ROTARY GEAR PUMPS

may be used efficiently for every phase of agricultural spraying in the United States

We are convinced that Oberdorfer *low pressure* bronze pumps, given the proper spray nozzle designs, are completely effective *for all agricultural spraying.* If this is so, there is no longer any need for the expensive high pressure equipment heretofore used in specialized spraying operations such as livestock, orchards, potatoes, shade trees, etc.

We base this statement on extensive research conducted by individuals and public and private agricultural research organizations, as well as on our own extensive experience. Since 1897, when the first Oberdorfer bronze rotary gear pump was made, we have learned something of their range of utility. We have had millions of opportunities to do so, particularly in the past few years when insect and disease control by spraying have become an essential procedure in all successful animal husbandry and plant cultivation.

OBERDORFER PUMPS AVAILABLE WITHOUT CHARGE FOR TESTING

We will provide any agricultural college, experiment station, extension worker or county agent with an Oberdorfer pump free of charge for test purposes.

Simply send us information about your spraying problem and we will give you one of the 300 Oberdorfer Spraying Pumps best adapted to meet your requirements according to information we presently have available. *Address:*

Experimental Department AC 515
AGRICULTURAL PUMP DIVISION
Oberdorfer Foundries, Inc., Syracuse, N. Y.

The name "OBERDORFER" is cast on every one of our more than 300 spraying pump styles and sizes. Look for it. It guarantees Extra Value.

Amm. Nitrate Gains Favor

Dr. R. C. Tallman, Lion Oil Company, El Dorado, Ark., speaking at the 119th national meeting of the American Chemical Society in Cleveland recently stated that ammonium nitrate is rapidly gaining favor as a fertilizer and may become the preferred material for direct soil application. It is comparatively high in nitrogen content and widely adaptable to soil and climatic conditions. Its comparative resistance to leeching, plus its low cost per unit of nitrogen make it appear to some that it will eventually become the nearly universal choice for direct application, according to Dr. Tallman.

•

Swift to Expand Fla. Plant

Swift & Co., Chicago have announced plans for expansion of their fertilizer and insecticide plant in Winter Haven, Fla. The plant, only four years old, will be expanded about 50%, it was announced by J. W. Whitaker, manager of Swift's plant food division in Florida.

•

New "Lindane" Booklet

California Spray-Chemical Corp., Richmond, Calif., has announced publication of a 32 page booklet entitled "*The Story of Lindane*". The booklet, in two colors, gives a brief background of the company, a short history of the compound and several pages of research and technical data on "Lindane".

•

New Blender Announced

The Patterson-Kelly Co., East Stroudsburg, Pa. has announced the development of the *Twin Shell Blender*, a mixer that consists of two equal-diameter cylindrical shells joined together to form a "V". A dust-tight discharge valve is located at the point of the "V" and the machine rotates on a horizontal axis. According to company spokesmen, the capacity of the mixer ranges from one to 250 cubic feet and power requirements range from ¼ to 20 hp.

•

To Produce Anhydrous Am

Suburban Propane Gas Corp., Whippany, N. J. has entered the nitrogen fertilizer business, it was announced recently by Mark Anton, president. He stated that the company is now marketing liquid anhydrous ammonia. Three storage plants for the fertilizer are located at Keller, Va., Delmar, Md., and Berlin, N. J.

•

Arkansas Weed Conf.

Strawberry growers from central Arkansas were to meet at the strawberry substation of the University of Arkansas Experiment Station at Ball Knob, April 20, to study chemical weed control in strawberry beds. Arthur T. McDaniel, junior horticulturist in charge, said that the Study Day would be the first to be held particularly for this purpose.

This section is the center of the State's commercial strawberry-growing industry, and most of the 2,000,000-crate annual crop is produced in three counties of the area.

MEETINGS

National Fertilizer Association. Greenbrier Hotel. White Sulphur Springs, W. Va., June 11-13.

American Plant Food Council. The Homestead, Hot Springs, Va., June 14-17.

Pacific Slope Branch, A.A.E.E., Edmond Meany Hotel, Seattle, Washington, June 19-21.

33rd Annual Meeting Amer. Phytopathological Soc., U. of Calif. (Los Angeles) June 19-21.

Annual Meeting of Pacific Northwest Fertilizer Dealers and Manufacturers, Corvallis, Oregon, June 28 & 29.

American Society of Agronomy, State College, Pa., August 13-15.

American Society for Horticultural Science, Minneapolis, Minn., September 5-7.

12th International Congress of Pure and Applied Chemistry, New York City, September 10-13, 1951.

Cotton Mechanization Conference, Cotton Branch Experiment Station, Chickasha, Oklahoma, Nov. 8 & 9.

Combined meetings of American Association of Economic Entomologists; Entomological Society of America; American Phytopathological Society; and the Potato Association, Netherland Plaza Hotel, Cincinnati, Ohio, December 9-13.

11th Annual Meeting, Northwest Vegetable Insect Conference, Imperial Hotel, Portland, Oregon, January 21-23, 1952 (David H. Brannon, Pullman, Washington, Secty.)

Hyman Issues Circular

Julius Hyman & Co., Denver, has issued a circular describing the control of grasshoppers with aldrin. Entitled "Control of Grasshoppers with the Insect Toxicant Aldrin", the circular, number 402-A, discusses dosage, mode of kill, residual kill, precautions and other points of interest. It is available upon request.

•

NFA Film "Deeper Acres"

The National Fertilizer Association, Washington, D. C., has announced the completion of its latest in a series of sound and color motion pictures. The new film, "Deeper Acres", is expected to be shown for the first time, this spring.

It is the first of the NFA films to use dramatic action for impact. A retired "front porch" farmer, is somewhat upset over the desire of his son to develop deeper acres rather than purchasing more land to increase the farm's output. However, through good management practices, including the use of fertilizer, the boy demonstrates the soundness of his ideas. At last, a grandson enters the picture, with ideas in advance to those of his father.

The picture demonstrates the advancement of better methods of agriculture with each generation.

•

Warfarin Regulations

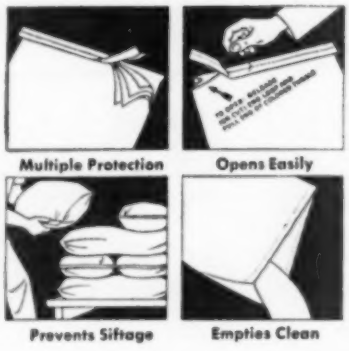
The Post Office Department, Washington, D. C., has notified the office of Mr. John D. Conner, Washington, that warfarin can now be shipped in cartons containing twelve one-pound containers of the mixed bait. The present regulation is ten pounds on the mixed bait. The limitation of eight ounces on the concentrate will remain in effect.

•

Ample Canadian Fertilizer

G. W. Michael, associate chief of the fertilizers division, Department of Agriculture, Ottawa, has recently reported that, except for phosphates, there should be no serious shortage of fertilizers by the end of 1951. Phosphates may be in short demand by the end of the year.

The time has come the Walrus said To talk of many things of Ships and Planes... Production Pains and everything it brings



"EVERYTHING," in the national emergency, can include whatever you make and ship. Overnight it might mean changes in type of design of your containers.

So the Union Multiwall Specialist (the Walrus, if you like) is ready to help you meet any such problem.

When you invite a Union Multiwall specialist to study your packaging, there's no obligation of any kind. But now, more than ever, you'll find his packaging engineering know-how valuable to you.

Better be safe . . . better be sure . . . better welcome the Union representative when he calls!

UNION Multiwall Bags

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Offices in: CHICAGO, ILL. • MINNEAPOLIS, MINN. • KANSAS CITY, MO. • HOUSTON, TEXAS • BALTIMORE, MD. • ATLANTA, GA.

Tracy Joins Powell

Dr. Ralph L. Tracy, formerly of the research staff of the California Institute of Technology and a captain in the Chemical Warfare Service, has been appointed to manage pilot plant operations for John Powell & Co., Inc., suppliers of insecticide materials.

DR. RALPH L. TRACY

Prior to joining Powell, Dr. Tracy was vice-president and technical director of Organic Chemicals Corp., Frederick, Maryland, and subsequently chemical engineer in charge of the benzene hexachloride and tetraethyl-pyrophosphate plants of the Miller Chemical Corp., Charles Town, West Virginia.

Dr. Tracy's present work is in connection with the new Port Jefferson Research and Development Laboratory recently opened by John Powell & Co., Inc. H. Alvin Smith, president, stated that the process and product development work which Dr. Tracy will direct is an integral part of Powell's plans for providing materials and services to independent insecticide formulators.

•

R. C. Botsford Retires

Robert C. Botsford, chief of the Division of Mosquito Control of the State Department of Health, New Haven, Conn. announced his retirement recently. He entered state service in 1923 when he went to the Connecticut Agricultural Experiment Station as deputy in charge of mosquito control. When the state board of mosquito control was established in 1939, he was named superintendent. Since January 3, 1951, he has been chief of the Division of Mosquito Control.

•

Pacific Slope AAEE Meets

Plans for the 35th annual meeting of the Pacific Slope Branch of the American Association of Economic Entomologists were getting well under way as the May issue of *Agricultural Chemicals* went to press. The meeting is scheduled to be held at the Edmond Meany Hotel, Seattle, Washington, June 19-21, according to R. S. Braucher, Dow Chemical Co. Great Western Division, Seattle, chairman of the arrangements committee. Members of the committee include W. J. F. Francis, R. D. Eichman and Keith Sime.

Topics to be discussed at the meeting include systemic insecticides, recent developments in mite control and up-to-date information on application equipment for pesticides. Entertainment is being planned for the ladies, also, the Branch has announced.

•

Fertilizer Aid Requested

A resolution passed at the 25th annual meeting of the Midland Cooperative Wholesale, Minneapolis, resuested government aid in developing low cost electric power projects on the Columbia and Snake Rivers of Washington and Idaho to provide electric power for processing phosphate fertilizer. It was pointed out that the co-op owns phosphate deposits in Idaho.

•

NFA Peanut Book Due

The National Fertilizer Association, 616 Investment Building, Washington, D.C., has announced that a new book entitled "The Peanut, The Unpredictable Legume," will be available after June 1. The price is $4.00.

According to the Association, the book will cover such topics as economic importance, morphology, genetics, physiology, cultural practices, insect pests and diseases. Each phase of the book is written by a different author and it is illustrated.

Luthi to Hyman Staff

Frederic J. Luthi, entomologist, has joined the staff of Julius Hyman & Company, chemical manufacturers, Denver, Colorado, where his duties will consist of technical development and sales promotion work with emphasis upon European and African markets.

F. J. LUTHI

Mr. Luthi was formerly with the Geigy Company. From 1941 to 1944 he was manager of the Scientific-Technical Plant Protection Department in their Chemical Works, Basle, Switzerland, where he made the first experimental plans and field tests for DDT products for agriculture and hygiene. Later, from 1944 to 1949, he was manager of Geigy Company's offices in Barcelona, Spain.

Mr. Luthi has a wide knowledge of European insecticide markets and insect problems and has been closely identified with agricultural problems and chemicals since his graduation from Federal Polytechnic School in Zurich, Switzerland, in 1932.

•

Plan New Fertilizer Plant

Benzol Distributors, Inc., Kearny, N.J., have announced plans for the construction of a new fertilizer plant in Dayton, Ohio. The new plant will be located on a portion of the site of the Dayton Fertilizer Corp. and will consist of new buildings and seven storage tanks.

Switch to KRYOCIDE®

SAFE

USE-TESTED

ECONOMICAL

...and you can get it now!

For many years, growers have used *Kryocide* Natural Cryolite insecticide in the control of many chewing insects. And today more than ever, they will look to *Kryocide* as a dependable protector of their crops—since it won't sterilize soil, harm crops for which it is intended, or upset natural insect balance.

✓ **READILY AVAILABLE**— *Kryocide* is a *natural* product, not presently dependent upon "critical" raw materials.

✓ **SAFE**—Won't harm soil, foliage or fruit for which it is specified . . . safer to handle.

✓ **COMPATIBLE** with most other insecticides and fungicides.

✓ **MICRON-SIZED** for maximum deposit with uniform coverage.

✓ **USE-TESTED** . . . proved to be economical and effective.

You can depend on Pennsalt insecticides, because they're backed by over a 100 years of experience in chemical manufacturing. Write, wire or call Agricultural Chemicals Department, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.; Tacoma, Washington; Bryan, Texas; Berkeley and Los Angeles, California; Portland, Oregon; Montgomery, Alabama.

KRYOCIDE controls many crop pests, including:

Cabbage Worms & Loopers	Mexican Bean Beetle	Cucumber Beetles (Diabrotica)
Grape Leaffolder	Sugar Cane Borer	Velvet Bean Caterpiller
Orange Tortrix	Walnut Husk Fly	Tobacco Hornworm
Tomato Worms	Melon Worms	Sugar Beet Webworm
	Cranberry Fruitworm	

PENN SALT
agricultural chemicals

PROGRESSIVE CHEMISTRY FOR OVER A CENTURY

The pasture subcommittee of the National Fertilizer Association's Plant Food Research Committee recently took a tour of inspection in South Carolina. Above, on the farm of S. B. Forsythe in Richland county, are (L to R): J. Fielding Reed, American Potash Institute; Borden S. Chronister, Barrett Div., Allied Chemical & Dye Corp.; H. A. Woodle, leader in agronomy extension in S. Carolina; James A. Naftel, Pacific Coast Borax Co. and chairman of the pasture sub committee; and county agent R. W. Bailey.

Fertilizer Combinations

That good management pays off, in the development of pasture lands, was demonstrated to the group attending the recent winter grazing clinic, sponsored by the Plant Food Research Committee of the National Fertilizer Association and the Extension Service of South Carolina. According to Dr. M. H. McVicker, chief agronomist of the NFA, the group witnessed at first hand the results of good practices and now "have no fear that cold winters spell the end to winter grazing."

A recipe for success was formulated by the group, in the form of a program including the following: develop a plan, prepare a good seedbed, lime as needed and fertilize heavily, seed early and heavy enough to insure a thick stand, use sound management, including rotational grazing to avoid overgrazing or undergrazing.

Borer Loss, $85 Million

Losses to the European Corn Borer in 1950 have been estimated by the U.S. Department of Agriculture as $84,912,000. The insect destroyed some 58,765,000 bushels of field corn, representing 19 percent of the estimated loss for 1949. The dollar loss was 24 percent of the previous year's loss. The borer population data on which estimates are based, were obtained through fall surveys by state agencies in 26 states, or 744 counties throughout the corn belt. However, damage estimates were made for 1,001 counties, or 257 more than surveyed, through use of district averages on average populations of neighboring counties. The 1,001 counties comprise 71 percent of the total counties known to be infected by the corn borer in the United States. No estimates were made for counties if insufficient data were available or if the loss was considered negligible.

A loss in yield of corn of 3 percent per borer per plant, the index of damage used in previous years, was applied to populations of the borer in calculating loss in corn production. This index is based on loss caused by single or first generation borers, and is believed applicable in 1950 due to the failure to the second brood borers to develop over a considerable portion of the infested areas. However, in cases where the states had additional information on the status of the borer in 1950 which permitted them to reach an estimate which they considered more precise than that calculated on the basis of the 3 percent damage index applied to fall borer populations, or where they considered a different statistical procedure more applicable, the state estimate was used.

Production data as reported in December 1950 by the Crop Reporting Board of the Bureau of Agricultural Economics were, with one exception, used as a basis for calculating losses.

•

Allethrin Plant Planned

U. S. Industrial Chemicals, Inc., New York plans to construct a plant for the production of allethrin, it was recently announced by W. P. Marsh, Jr., president of the company. According to the statement, construction will be started immediately on the new plant, which will be located in Baltimore, and completion is expected by late 1952.

In making the announcement, Mr. Marsh stated that production of the chemical, possessing some of the properties of natural pyrethrum, would aid materially in filling the needs of the defense program. Pyrethrum is in short supply.

•

Nitrogen Sources Studied

M. T. Vittum, Division of Vegetable Crops, Geneva, New York has recently completed work on organic nitrogen in fertilizers. According to Mr. Vittum, six years of research with cabbage, peas, sweet corn and tomatoes has indicated that there is no significant difference between yields of crops when fertilized with inorganic sources of nitrogen and the more expensive organic sources.

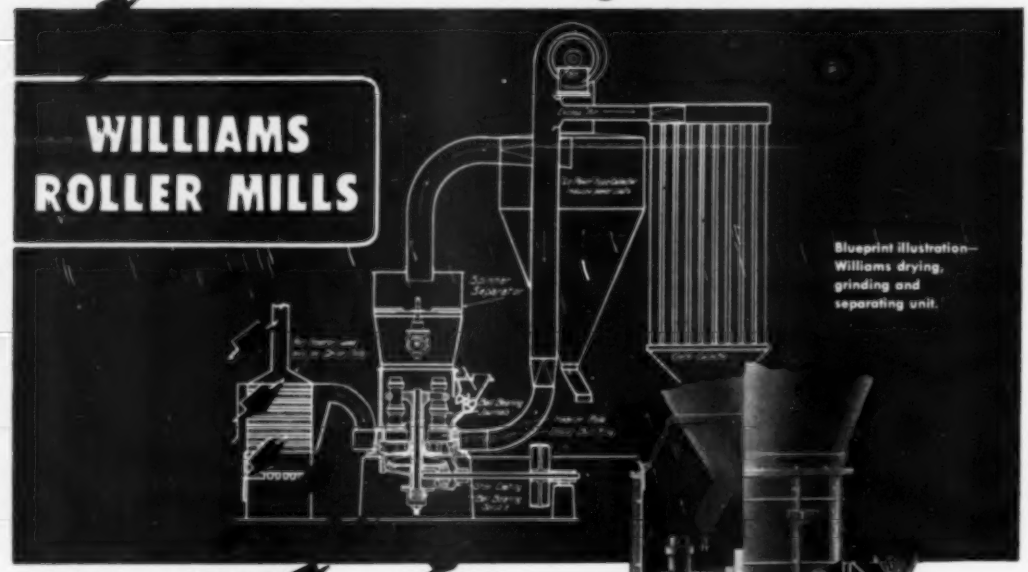
•

Klussendorf to CSC

Dr. Raymond C. Klussendorf has been appointed Director of Veterinary Medical Services of Commercial Solvents Corp., New York, it was announced by T. S. Carswell, vice president in charge of research and development. Formerly editor-in-chief of the *Journal of Veterinary Medical Association*, Dr. Klussendorf will work closely with the research and sales department of CSC.

For those Fine Grinding Jobs . . .

WILLIAMS ROLLER MILLS



Blueprint illustration—Williams drying, grinding and separating unit.

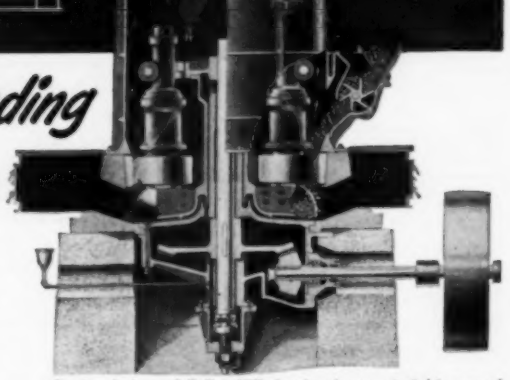
200 to 325 mesh Grinding

Fine grinding of insecticide powders can ONLY be done economically with PROPER fine grinding equipment and we believe the Williams Roller Mill with Air Separation is the finest mechanical method of material reduction on the market today.

Experienced, engineering know-how, embodied in the design of the unit permits the production of high concentrations of DDT, BHC, Toxaphene, etc., — thoroughly blended. Also pulverizes Pyrethrum, Rotenone, Sulphur for Dusting and Gypsum, Limestone, Rock Phosphate and similar products on an around-the-clock schedule.

Control of product size is assured with the Spinner Air Separator. Finenesses of 98% and 99.9%, 325 mesh are obtainable and can be consistently maintained. A clean, dustless installation from feed opening to finishing product bin, all automatically handled, makes this unit additionally desirable for your plant.

Williams Roller Mills are available in a full range of sizes.



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

WILLIAMS ALSO MAKES . . .

Heavy Duty Hammer Mills for crushing and grinding rock phosphate, gypsum, limestone . . . also for disintegrating ammonium sulphate lumps and fertilizer mixes that "set-up" in storage. The Helix-Seal Pulverizer for disintegrating and blending insecticide mixes and concentrations ready for use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
2707 N. BROADWAY ST. LOUIS 6, MO.

Oldest and Largest Manufacturer of Hammermills in the World

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

C.S.C. Ag. Division Executives
(Left to Right): Daniel B. Curill, Jr., manager of the Agricultural Division; Dr. Hugh R. Stiles, technical director; Dr. James W. Brooks, in charge of sales in the central states; and Hugh C. Bragdon, sales representative of Commercial Solvents Corp.

C.S.C. Expands in Midwest

The agricultural division of Commercial Solvents Corporation has moved its offices in Terre Haute, Ind. to new and larger quarters at 105 South 7th Street. The move was necessitated by the rapidly expanding business of the division in the feed, fertilizer, and insecticide fields. Additions to the sales force are planned, particularly in the central states for which the Terre Haute office is headquarters, according to Daniel B. Curll, Jr., manager of the division.

Dr. Hugh R. Stiles, technical director of the agricultural division, will devote his entire time to technological developments in the agricultural field, with particular emphasis on nutritional problems connected with the company's new antibiotic feed supplements and other feed products. In this capacity, he will continue to work closely with Federal and State experiment stations.

Dr. James W. Brooks is in charge of sales of agricultural products in the central states. Hugh C. Bragdon will continue to handle feed product sales in this area.

Oregon Fertilizer Meet.

The annual meeting of fertilizer dealers and manufacturers of the Pacific Northwest is planned to be held June 28 and 29 at Corvallis, Oregon, according to Dr. B. R. Bertramson, chairman of the department of agronomy, Washington State College, Pullman. Dr. Bertramson indicated that plans are also being made for a meeting of soil and plant testing specialists to discuss soil and tissue analyses on the preceding day. It is stated that all technical personnel of the area is invited to attend.

•

Kring Joins Conn. Staff

Dr. James B. Kring, formerly of Kansas State College, Manhattan, Kansas, has joined the staff of the entomology department of the Connecticut Agricultural Experiment Station, where he will specialize in work on soil insects, particularly wireworms on tobacco and potatoes.

Hansberry Polio Victim

Dr. Roy E. Hansberry, director of Shell Chemical Corporation's agricultural experiment station at Modesto, California, was stricken with polio recently while on a South American tour for the company. He became ill at Maracaibo, Venzuela, and was treated there by native physicians. Now back in the States, he is expected to recover fully in time, but may not be able to return to his desk for several months.

•

Hukill Represents Emulsol

The Hukill Chemical Corporation, 2533 Broadway Ave., Cleveland, Ohio, is now representing the Emulsol Corporation, Chicago, Illinois, in Central and Southern Michigan areas, in addition to Ohio, on the technical service and sales of surface active specialties to the food, pharmaceutical, industrial, and agricultural industries.

Inter'l Minerals Builds

International Minerals and Chemicals Corp., Chicago has announced plans to construct a new phosphate chemical plant in Florida. Louis Ware, president, in making the announcement, stated that the initial objective of the plant will be to produce defluorinated phosphate for animal feeding and for commercial fertilizers. The recovery of uranium will be an additional step in these processes.

•

Sells Sprays in Kansas

Douglas Chemical & Supply Co. manufacturers of grain fumigants and agricultural sprays, has appointed A. C. Porter as its Kansas representative.

•

Montfort Joins Pennsalt

Kenneth W. Montfort has joined Pennsalt of Washington as district sales representative, it has been announced by William J. F. Francis, assistant manager of sales of the West Coast organization. Mr. Montfort will make his headquarters at the company's Portland, Oregon, office and will devote his time to the sales and service of agricultural and industrial chemicals in Oregon, Colorado, Utah and Southern Idaho. He will report to Mr. L. M. Shanaman, Asst. Mgr. of Sales at Portland.

The new appointee is a native of Blaine, Washington, and was formerly associated with Northwest Wholesale's chemical supply department in Wenatchee, Washington.

KENNETH W. MONTFORT

CSMA in Chicago Meeting

The Chemical Specialties Manufacturers Association was holding its 37th midyear convention at the Drake Hotel, Chicago, as this issue went to press. The meeting, scheduled for April 30 and May 1, was to include an aersol session April 30, with E. G. Young presiding, and a division on insecticides with James A. Green in charge. The latter session was to present a discussion on housefly resistance by Dr. George C. Decker, Illinois Natural History Survey, Urbana; a report on the recent tolerance hearings, by John D. Conner, Washington, D.C. and other papers covering testing laboratories and toxicity of household pesticides.

A symposium on allethrin was also scheduled for Monday morning, with Dr. H. L. Haller, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., as moderator.

The program for Tuesday, May 1, included a joint session of the insecticide and aerosol division, in charge of T. C. Parkinson and H. E. Peterson. "Aerosol Evaluation" was to be discussed by R. A. Fulton, U.S.D.A. and a symposium was also on the program. The association dinner was to be held on the evening of May 1.

•

Protests H_2SO_4 Diversion

James M. Quinn, president of the California Fertilizer Association, recently wired officials of the National Production Authority and the PMA that the current diversion of sulfuric acid to non-agricultural uses is bringing about a "desperately serious situation" for the fertilizer industry and for the growers. The CFA was urging all of its members and interested groups and individuals to apprise Washington leaders of the urgency of the situation. Mr. Quinn's wire follows:

"Due to diversion of sulphuric acid to oil companies the amount now available for producing superphosphate and sulphate of ammonia critically short of amount needed to meet minimum California and Arizona demands. Added demand caused by shortage of agricultural fertilizer materials results in desperately serious situation for growers. We urge that June first allocations provide ample supplies of sulphuric acid to take care of needs of producers of superphosphate and sulphate of ammonia in addition to defense needs."

•

Cuba Needs Fertilizer

Increased imports of fertilizer into Cuba are in prospect according to the U. S. Department of Commerce which says that requirements for various types of fertilizer have increased by nearly 30,000 Cuban short tons. Additional amounts needed are said to include 8,000 tons of phosphate rock, 4,000 tons of ammonium sulphate, 3,000 tons each of ammoniated and triple superphosphate and 2,000 tons each of superphosphate, sodium nitrate and potassium nitrate.

Technical Briefs

Fly Resistance Studied

That certain strains of flies are highly resistant to several insecticides, is no longer in doubt, but the how and why of such resistance is not so well known. It is likely that tolerance for insecticides may be extremely variable and induced by the independent or joint action of many independent characters. Because there is no single factor responsible for tolerance in flies, a number of tentative recommendations may be made to offset this tendency.

1. Good sanitation should be emphasized as the first and most important step in fly control.

2. Screens and other mechanical devices should be used to the limits of their practical value.

3. The non-residual space sprays should be used where practical.

4. The use of mixtures containing several residual-type insecticides should be avoided.

5. Residual type sprays should be applied in a manner that will not contaminate straw, manure and other fly breeding media.

6. If larvacides are used, they should not be closely related chemically to any of the residual type sprays.

—*From "Where Are We Going in Fly Resistance?" by George C. Decker and W. N. Bruce, Illinois Natural History Survey, Urbana, Ill. Paper presented before 37th mid-year meeting of Chemical Specialties Mfgrs. Assn. Chicago, April 30.*

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Orchard Weed Control

A spray containing one and a fourth pounds of actual dinitro plus 10 gallons of fuel oil emulsified in water to make 100 gallons did not injure the woody stems of young apple and peach trees when applied so as to wet the weeds thoroughly. The dinitro-oil spray is effective and economical for the control of most weeds.

Fuel oil alone may be used in preference to dinitro spray wherever perennial grasses occur, particularly quack grass, according to Dr. O. F. Curtis, New York experiment station. These grasses recover quickly after a dinitro spray, but when fuel oil is used they recover only after several weeks and then only to a fraction of the original stand, he states.

Fuel oil (medium or No. 2 oil) is applied at the rate of about 100 gallons to the acre and must wet the base of the grass stems thoroughly. Tree stems will not tolerate fuel oil, but spot treatment of quack grass in the nursery row is possible without wetting the trees.

Fuel oil has also proved effective in controlling quack and other grasses in garden borders and around shrubbery and home plantings.

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Seed Treatment on Legumes

The effect of three chemical seed treatments on red clover alfalfa, and swet clover was studied in wet and dry soil. Red clover seed treated with three different rates of Arasan, Ceresan M, and Phygon and planted in wet and dry soils showed no significant increase in emergence. Some treatments which appeared harmless in wet soil reduced the emergence or injured the seedlings when the seed was planted in dry soil. Alfalfa was neither benefited nor injured by most treatments. The reaction to treatment was nearly the same in wet and dry soil. One per cent Ceresan M caused injury to seedlings in wet and dry soil in the greenhouse, and 1 per cent Phygon reduced the emergence in the field under drouth conditions. Sweet-clover emergence was increased by treatment with Arasan and lower rates of Ceresan M in the greenhouse. Another seed lot was not benefited by any seed treatment. A number of treatments which were harmless in wet soil reduced the emergence or injured the seedlings in dry soil. Arasan, which appeared beneficial or harmless in dry soil in the greenhouse, significantly reduced the emergence of sweet clover in the field under drouth conditions.

—J. W. Gerdemann, "Effect of Seed Treatment on Forage Legumes in Wet and Dry Soil", *Phytopathological Abstracts*, Vol. 41, January, 1951.

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Fertilizer Tests Made

Results of three experiments conducted near Kirbyville and Cleveland during 1949 and 1950 to determine the effect of different rates and combinations of nitrogen, phosphoric acid and potash on yields of forage and grain from Camellia oats are summarized as follows:

At Kirbyville, on Bowie fine sandy loam, the most favorable fertilizer treatment was 60 pounds of nitrogen. Small and irregular increases in yield resulted from the use of phosphoric acid and potash with nitrogen.

At Cleveland, on Katy fine sandy loam, the most favorable fertilizer treatment was a mixture of 60 pounds each of nitrogen and phosphoric acid. Small and irregular increases in yield resulted from the use of potash with nitrogen and phosphoric acid.

Grain yields were reduced by a single clipping for forage at Cleveland but were not reduced at Kirbyville. The reduction in grain was more than equaled by the value of the forage.

—Summary of Progress Report #1327, Texas A. & M. College, College Station, Texas. Report by E. D. Cook, J. C. Smith, L. E. Crane and R. F. Bates.

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New Laboratory Press

Knuth Engineering Co., Chicago, has announced production of their new K & K Laboratory Press, Model 100 for use in laboratories in need of a portable, low pressure unit. It is a simplification of a press that was previously restricted to custom design by special order, and is designed for pressures up to 83 p.s.i.

Washington Report

IT now appears that the insect threat to this year's planned bumper crop of cotton may not be as great as was first feared. However, it will be serious enough so that cotton farmers should prepare themselves with adequate control measures. This is particularly important in view of the goal of 16 million bales of cotton and the price of about 45¢ which has been established by the Office of Price Stabilization.

The Bureau of Entomology & Plant Quarantine in cooperation with State, Federal and other agencies issued its first report on cotton insect conditions on April 2, 1951. In previous years the first cotton insect surveys were not issued before May. However, the Bureau points out that this year there has been such an unusual demand for information concerning the winter survival of the boll weevil and pink boll worm that it seemed desirable to distribute much of the information now available in regard to the survival of these major pests of cotton. Preliminary data indicates that the number of boll weevils that lived through last winter was about the same as in a year of average winter temperature. This is in spite of the fact that probably a greater *number* of weevils went into hibernation last fall than at any other time on record. In Louisiana, for example, the greatest concentration of weevils per acre on record went into hibernation last fall! Yet, because of heavy mortality during the severe winter, as we go into the 1951 growing season, there is just about the same number surviving as in a normal year.

The pink bollworm, following the greatest spread in distribution on record in 1950, overwintered in abundance in south and central Texas. A favorable season for this insect pest in the Texas area this year might mean additional trouble for the east. This could be a severe hardship for the cotton farmers if the spread continues, for the pink boll worm is considered the most serious of all cotton pests.

This all adds up to the fact that at the moment chemical manufacturers are still having great difficulty in meeting demand for insecticides. However, production of technical B HC, technical DDT and toxaphene has been at an all time high. The market has remained very firm and prices in the resale market have assumed practically the proportions of a very dark gray market.

On other farm fronts, it appears that 1951 is going to be another record breaking year for agriculture if weather conditions are average or better. Farm experts are predicting that this year's agricultural production for sale and for consumption will top the last record breaking year, 1949, which in itself was 40% above the 1935 and 1939 average. Indications are that the total acreage of 17 spring planted crops will be smaller than last year, but a considerable part of this decline will be offset by the larger acreage sown to wheat last fall and a much larger acreage for cotton which hasn't been tabulated yet.

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A tightening in the rules governing pesticide labeling is included in a bill introduced in the House by Representative Frank E. Smith of Mississippi. The bill which has been referred to the House Committee on Agriculture for consideration, has to do with ingredient statements. The purpose is to assure information on the formulation ingredients being available, particularly where the poisons are toxic to humans.

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The National Production Authority has announced that the controlled materials plan under which three basic materials, steel, copper, and aluminum, will be allotted for defense production and defense supporting activities will go into effect July 1st. It was pointed out that CMP is considered the best method of continuing to provide an orderly distribution of basic materials among defense and civilian producers now that the defense program is actually taking large quantities of these materials, and it is further considered the best method for handling a greatly enlarged military program if circumstances make that necessary. The plan itself will have little if any immediate effect on the chemical insecticide industry outside of providing a sufficient amount of these three basic materials for the manufacture of chemical industry machinery and machinery for the agricultural pesticide industry.

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The Production & Marketing Administration of the Department of Agriculture has recently undergone an additional reorganization. The total effect of the previous reorganizations has been to make everything more or less status quo. L. B. Taylor who had previously been appointed Director of the Agricultural Conservation Program Branch of PMA in the recent shakeup, has now been re-appointed as Director of the Office of Materials & Facilities. It is under this office that agricultural pesticides and fertilizers are directed in the Department of Agriculture. Under Mr. Taylor, W. R. Allstetter will continue directly in charge of this propram. Mr. Allstetter is Deputy Director of the Office of Materials & Facilities. Ralph S. Trigg, who was formerly Production & Marketing Administrator, has been made a special assistant on Commodity Credit Corporation affairs to Secretary of Agriculture Brannan.

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The Office of Price Stabilization has under consideration a proposed price regulation on agricultural chemicals. The regulation provides methods alternative to those provided by the general ceiling price regulation for the fixing of ceiling prices at the retail level only. It also provides that the seller's ceiling price for these seasonable commodities shall be determined by adding to replacement cost the dollars and cents margin above costs obtained by him on sales of like units of such commodities, delivered in the calendar month in which he delivered the largest amount of such units in a given 12 month period. Where the seller is a manufacturer, the regulation will provide that his cost and replacement

cost shall be calculated on the basis of raw materials and containers.

This regulation is still in the talking stage, but it is hoped that it will be issued prior to the active months ahead.

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Three items are in short supply and formulators and dealers are experiencing considerable difficulty in obtaining them. 2,4-D, chlordane and copper sulphate are the three which are likely to remain critical in spite of attempts now being made by interested government agencies to help their supply situation.

The difficulty with copper sulphate is for the most part tied up entirely with the lack of ceiling prices on scrap copper, the raw material required in making copper sulphate and fixed copper compounds. Since there are no uniform price ceilings on scrap copper, the ceiling varies for each individual supplier of material. Hence, copper sulphate producers are experiencing difficulty in obtaining material at a price so that they can sell finished copper sulphate and basic copper compounds at their own ceilings. On the other hand, the Office of Price Stabilization will not allow them to increase their own prices of the finished product and at present will not put out an order to take care of the scrap copper ceilings.

2,4-D is suffering for the most part from shortages of phenol and chlorine. However, NPA is looking very carefully into the matter and it was expected would provide by directive sufficient amounts of phenol and chlorine to assure larger production of 2,4-D during the months of May and June.

The tight situation on chlordane is probably due to the shortage of chlorine and other organic intermediates needed in chlordane production. Furthermore, the load for supplying chlordane has been shunted over to the one company since by court decree the other producer is no longer permitted to make the material.

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The sulphur situation continues to cause difficulty also. There are reports in the trade about a rather large export requirement for dusting sulphur for Greece which has effected somewhat the immediate availability of dusting sulphur for domestic agriculture. However, NPA has also very carefully surveyed this predicament and has made available an additional quantity of crude sulphur to take care of the foreign requirement. At the same time, NPA has provided for a substantial additional tonnage of material to take care of heavy seasonal requirements of sulphur for cotton and other important uses.

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As reported here last month, DDT Producers Industry Advisory Committee at its recent meeting came up with a recommendation that only 20% of the DDT manufactured during April, May and June need be set aside for DO rated orders. Here was a case where there was a combination of increased DDT production and a slight decline in actual military requirements during the second calendar quarter of 1951. In addition, the military undertook to delay to some extent their take so that needed heavy deliveries could be given to agricultural users during the second quarter.

However, there is still a very serious situation with regard to the amounts of DDT required for important projects overseas, and NPA is now looking very carefully into this problem.

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The Office of Materials & Facilities of the USDA's Production & Marketing Administration, in conjunction with the Containers Division of the National Production Authority, announced on April 20th that a special directive was issued to specified manufacturers to deliver quantities of 55 gal. drums and 5 gal. pails to manufacturers and formulators of liquid pesticides. Monthly delivery quotas for April, May and June are assigned to drum and pail manufacturers, but there were no quotas assigned to the ordering companies.

The announcement further specified that each person to whom deliveries of steel shipping containers are made pursuant to the directive issued by NPA, are to furnish the following certification endorsed to or attached to the purchase order:

"I hereby certify that the containers covered by this purchase order are for shipment in liquid form of pesticides usually used for crop protection. The receipt by me of these containers will not cause my inventory to exceed a practicable minimum working inventory of such containers."

There were listed approximately 27 pail and drum manufacturers to whom this directive applies, and formulators and manufacturers of the agricultural pesticides were urged to file promptly the necessary purchase orders.

* * *

House of Representatives Bill 3257 was introduced by Congressman Miller of Nebraska. It has to do with a proposed amendment to the Federal Food, Drug & Cosmetic Act providing for the regulation of chemical additives in food. The bill is identical with the proposals made by Mr. Crawford of the Food & Drug Administration at the Delaney Committee hearings and would place pesticides along with other chemicals under the Food & Drug Act with a provision similar to the new drug section.

It was somewhat surprising that the bill had been introduced by a member of the Delaney Committee while the hearings were still in session. Ordinarily, it would have been expected that a bill of this kind would have been proposed following completion of the hearings. It will be very interesting to see what happens on this proposed bill. It is certainly expected that members of the agricultural pesticide industry will create quite a storm of protest about the way that this entire proceeding was handled.

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The daily newspapers recently carried articles on the dispatching of American crop dusting pilots for southern Iran to help fight what is reported to be the worst plague of locusts in that country in 80 years. In addition to the pilots, small knockdown planes that are to be used in the spraying, together with the drums of insecticides themselves, were shipped by air. It is believed that the insecticides consisted of aldrin, BHC and toxaphene, all of which

had proven to be extremely valuable in fighting this insect pest. The pilots and the spraying airplanes were shipped at the request of the State Department after it had received a plea for help from the Foreign Minister of Iran. It is contemplated that 5 more spraying aircraft and additional quantities of insecticides are to leave shortly.

It will be recalled that last July the Anti-Locust Research Center was established in London, which organization was concerned with raising sufficient funds and marshalling technical help to fight this plague. The plague has reached such extreme proportions that two international anti-locust conferences were held, one in November in New Delhi, and the other in Cairo in March, 1951. Even behind the Iron Curtain or on the border of Iron Curtain countries, American ingenuity is sometimes called upon when all other means fail.

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The daily newspapers recently reported that the county of Aroostook in Maine is turning its interest to the study of manganese ore deposits. The readers of this magazine always looked upon Aroostook County as the nation's potato empire, but the development of DDT and other synthetic organic chemicals has changed the economic face of this country. The press pointed out that Aroostook County was no longer the empire in the potato field because of the ending of price supports, and the decline in national consumption, but the real truth is that local competition from other areas which previously could not grow potatoes effectively, has now entered into the potato field once again because of the newer pesticides that have been developed. Certain areas in upper New York State and Pennsylvania previously had to stop growing potatoes because of the insect pests which they were unable to control. However, with the advent of DDT and other synthetic materials to fight these pest ravages, these areas are now once again coming into the potato growing picture.

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The annual U.S.D.A. fertilizer consumption report was nearing completion early this month, and is scheduled to appear in *Agricultural Chemicals* June issue. The report, compiled by Walter A. Scholl and H. M. Wallace, is expected to be the biggest work yet, and will probably herald the use of record-breaking amounts of fertilizer materials.

The National Fertilizer Association's annual report which was to be distributed about May 14, shows an increase of 11% over the 1949 total. Some 18,256,000 tons of fertilizer were consumed during the 1950 fiscal year, according to the NFA figures. Incidentally, the 3-12-12 grade is now the most-used fertilizer the country over, NFA says. The former champ, 2-12-6, has been eclipsed.

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The Office of Price Stabilization is reported to have under way price ceiling regulations for the manufacture and sale of fertilizers and household insecticides. Aim of the order is to relieve price squeeze at retail level and to permit shifting of stocks from areas where need is less to sections where crop production needs are more acute.

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Rumors around the capital early in May insisted that both sulfur and sulfuric acid would be allocated "across the board" soon. Just how soon, no one would venture a guess. The fertilizer industry, pointing out the necessity for more of this element if adequate amounts of food and fiber are to be grown this year and next, is gunning for more sulfur to fulfill its needs.

When these allocations do come, it is likely that users will receive their allottments on an essentiality basis, it has been indicated. This is to be done with as little disruption as possible in normal distribution. The new system must be worked out from the ground up, since control officials did not face this specific problem in World War II. The latest word is that sulfur will probably be controlled under a new order and not added as a schedule to the General Chemical Order M-45 as sulfuric acid was.

One of the biggest problems is that of determining the essentiality of industries which depend on the element for the manufacture of various goods. The agricultural chemical trade expects to receive a high priority in this regard, as has been indicated in previous statements.

A complicating factor involves transportation of sulfur to areas reached via the Great Lakes since these waterways cannot be used during winter months. Thus, it must be determined how much must be shipped during the warmer season to tide over these industries for the cold weather.

The limited allocation on sulfuric acid became effective as of April 18. Designated as Schedule 3 to Order M-45, it applies to the states of Washington, Oregon, California, Arizona, New Mexico, Nevada, Utah, Colorado, Wyoming, Idaho and Montana.

Purchasers of sulfuric acid in these states are directed to certify to suppliers the end-uses to which the chemical would be put. Suppliers, on the other hand, are required to report to NPA (on form NPAF-47), names of their customers, quantities orders and end-uses certified. Filing date is the 10th of the month preceding the proposel delivery month. The order exempts those purchasing sulfuric acid in quantities of 60 tons or less per month.

No NPA authorization is needed to use spent sulfuric acid recovered from acid certified for a particular purpose, except when it is used in "combination with any other material to produce a saleable product." The order also permits delivery of spent sulfuric acid to the original supplier without NPA authorization. The original supplier, however, must again apply to NPA for permission to deliver and to use spent acid for any purpose but "fortification or decomposition."

In announcing the limited allocation, NPA points out that although the shortage is national in scope, it is particularly bad in the far west. This is due first to lack of adequate productive capacity in the region, and the difficulty of transporting sulfuric acid from plants in other parts of the country.

The sulfuric acid order sets up a reporting mechanism for suppliers in all states so that a national end-use pattern can be readily adapted

for national control, such as was expected almost momentarily as this issue went to press.

In the meantime, round-the world reverberations were being heard as a result of the sulfuric situation.

Plans to build a $9.8 million sulfuric acid plant have been announced by three large British industrial groups who propose to form a new company to build and run the plant. The firms involved include Fisons, a large fertilizer manufacturer; Imperial Chemical Industries; and a rayon manufacturer. (Courtauld)

No site has been chosen although the Mersey River area of Lancashire has been mentioned as a possibility. The plant will be designed to produce 150,000 tons of sulfuric acid annually and may be in production by the end of 1952. The acid will be produced from anhydrites which are plentiful in several parts of England.

A Scottish firm has also made plans to construct a new sulfuric acid plant at Sandilands Chemical Works in Aberdeen. This plant is expected to be in production in two years, and will have a capacity of 37,000 tons of 100% sulfuric acid annually. The instalation will be a combination of a flash roasting pyrites furnace and a Peterson tower plant.

Efforts to find new sources of sulfur are continuing by U. S. producers, in order to keep pace with the unprecedented demand Texas Gulf Sulphur Co. for instance, not only has mines at Boling Dome, Texas, and Moss Bluff, Texas, being operated at capacity, but also a plant at Worland, Wyoming, where sulfur is recovered from sour gas.

Last year, th. company drilled sulfur test holes at Spindletop Dome near Beaumont, Texas with encouraging indications; and also began construction of an operating plant similar in size to its present Moss Bluff plant. It is expected to be in production before the end of 1951. The company is also exploring sulfur possibilities in the Republic of Mexico. The surveying and geophysical operations to guide the search, are still under way and an exploratory drilling campaign begun in 1950, is currently in progress although no discovery has been made.

As has been stated previously, present demands on sulfur producers exceed their collective capabilities to produce, load and ship. The industry was called upon in 1950 to supply more than twice the 1939 demand and more than 150 percent of the peak wartime requirements.

Explorations for new sources are continuing while the agricultural chemical trade tries to make its supply stretch as far as possible.

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Fertilizers and Cotton

With American farmers being asked to produce almost twice as much cotton this year as they produced in 1950, some increase in acreage may take place, but the bulk of the increase must come from increased yields. The only satisfactory method to increase yields in such quantities is by use of proper commercial fertilizers.

E. C. Westbrook, Agronomist of the Georgia Agricultural Extension Service, Atlanta stated that on much of the land in the Southeast, from one-half to two-thirds of the cotton yields are due to commercial fertilizers. Maximum yields cannot be obtained without proper fertilization.

Nitrogen, phosphorus and potash are essential constituents of commercial fertilizers. According to a report by Mr. Westbrook, a larger percentage of cotton produced by fertilizer is attributed to nitrogen than to phosphoric acid or potash. In a large number of experiments on a wide range of soils, nitrogen applications of from 8 to 50 pounds per acre increased the yield ranging from 11 to 15.5 pounds of seed cotton per pound of nitrogen. Experimental data shows that increased yields from applications of phosphoric acid and potash are less significant than those from nitrogen. A pound of phosphoric acid produced approximately two pounds of cotton seed when applied at the rate of 50 pounds per acre.

According to the same report, the efficiency of fertilizer is increased by making applications after the cotton has come up. Nitrogen applied as a side dressing at the first cultivation of cotton after thinning in addition to the fertilizer applied at planting promotes rapid growth and results in early blooming and early boll formation.

J. F. Doetsch, president, Chilean Nitrate Sales Corp., reminds that the boll weevil is a serious threat to the cotton crop. Other insects take their toll, but not like the weevil. Fertilization is one of the most important factors in the production program, and proper application of fertilizers can do much toward check-the weevil.

Side-dressing tends to stimulate early and rapid fruiting ahead of the weevils. After chopping, 200 to 300 pounds of nitrate of soda applied in this manner will tend to make the cotton bloom early ahead of the weevils and increase yields.

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Pacific Slope APS Meets

The Pacific Slope Division of the American Phytopathological Society will hold its 33rd annual meeting on the University of California campus, Los Angeles, June 19-21, according to George A. Zentmyer, secretary-treasurer of the division. The meeting is to be in conjunction with the meeting of the Pacific Division of the AAAS.

Papers on plant pathology will be presented in the morning and afternoon of June 19 and the morning of June 20. A Joint session on the 20th is also scheduled to discuss "Air Pollution and Plant Life." Also scheduled for that afternoon is a demonstration session on various phases of plant pathology. A plant pathologists' dinner is to be held on the evening of June 20 and a field trip is scheduled for the following day.

Officers of the pacific division, in addition to Dr. Zentmyer, are: Earle C. Bladgett, Prosser, Washington, president: Wm. B. Hewitt, Davis, California, vice-president; and S. M. Dietz, Corvallis, Oregon, councilor.

Suppliers' Bulletins

Bagpacking Booklet

Bagpak Division of International Paper Co. has issued a booklet describing its line of bag-closing equipment. The literature points out the extra-heavy welded steel construction of the bagging machines, and the type of operation applicable to the agricultural chemicals trade. Write for booklet 265-D, International Paper Co., 220 E. 42nd St., New York 17, N. Y.

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Offers New Type Loader

A new wheel tractor loader featuring a hydraulic torque converter drive and an entirely new design clutch-type transmission is now manufactured by Tractomotive Corporation, Deerfield, Illinois. It is called the "TL-10 Tracto-Loader."

The single stage torque converter is said to furnish a constant flow of power to the drive wheels. There is practically no spinning of wheels while loading, and crowding action is improved, according to the manufacturer. Loading in a higher gear is possible, and the new clutch-type transmission eliminates most gear shifting. The operator can go forward or reverse by simply pushing or pulling one lever. Reverse speed is almost twice as fast as forward.

Information may be obtained by writing to the company, address above.

New Conn. Bulletin

The Connecticut Agricultural Experiment Station, New Haven, has issued bulletin 548 on "The Effect of Some Polyethyleneglycol Derivatives on the Toxicity of Nicotine to Insects." Written by Neely Turner, D. H. Saunders and J. J. Williams, the bulletin reports results of experiments to determine the effects of wetting agents on the toxicity of nicotine.

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Dual-Purpose Truck

Transitier Truck Co., Portland, Oregon, has introduced a new "power bucket" accessory for handling bulk materials in connection with the firm's "Hi-Duty" lift trucks. A

(Turn to Page 115)

Aladdin could give this command to his genie and expect every grasshopper to be as good as dead. There's no such genie around today, of course—but, for killing grasshoppers, give *your* command to the next best thing . . . powerful aldrin.

Everywhere farmers and ranchers are amazed that just two ounces of chemical kills so many, many hoppers.

Yes, two ounces of aldrin in oil or water is the dose for an entire acre, no matter whether hoppers are 10 or 500 per square yard! 8 acres of dead hoppers per pound of aldrin . . . and the kill averages 96% in three days' time.

Your formulations require less chemical content when you use aldrin . . . a decided economy. And the demand for aldrin's amazing control is building up fast. Why not take steps to supply it?

aldrin

SHELL CHEMICAL CORPORATION

Aldrin is manufactured by Julius Hyman & Company, and is distributed by Shell Chemical Corporation, 500 Fifth Avenue, New York 18. Aldrin is available under the brand names of leading insecticide manufacturers.

Industry Patents

2,540,170. Composition for and Method of Inhibiting Fungi. Patent issued February 6, 1951 to George H. Law, South Charleston, W. Va., and Richard H. Wellman, Yonkers, N. Y., assignors by mesne assignments to Union Carbide and Carbon Corporation, New York. Method of inhibiting fungi which comprises applying to a host a fungicidal composition comprising, as an active fungicidal ingredient, a substituted glyoxalidine having a saturated 17 carbon atom aliphatic group connected directly to the carbon atom at the 2 position in the glyoxalidine ring, and a diluent, the composition containing undissolved glyoxalidine and having a phytotoxic activity no greater than that corresponding to a dispersion of 10 parts by weight of 1-hydroxyethyl-2-heptadecyl glyoxalidine in 1000 parts by weight of water.

2,540,171. Fungicide. Patent issued February 6, 1951 to Ben W. Kiff, Ona, W. Va., assignor by mesne assignments, to Union Carbide and Carbon Corporation, New York. A concentrate adapted to be made into a spray for combatting plant pests by the addition of water and an alkaline material, comprising a mixture of a glyoxalidine salt of an aliphatic, monocarboxylic acid and a member of the group consisting of alcoholysis and hydrolysis products thereof, in solution in an alcohol, there being a larger proportion of the salt than of a member of said group, the organic acid having from 2 to 8 carbon atoms, the alcohol being a monohydric, acyclic saturated alcohol having from 1 to 4 carbon atoms inclusive.

2,540,209. Copper Fungicidal Compositions Safened with Zinc Sulfite. Patent issued February 6, 1951 to Alexander A. Nikitin, College Park, Ga., assignor to Tennessee Copper Company, New York, N. Y. A composition for application to plant foliage and fruit for the control of pests which contains zinc sulphite together with a copper fungicide.

2,540,210. Arsenical Insecticide Safened with Zinc Sulfite. Patent issued February 6, 1951 to Alexander A. Nikitin, College Park, Ga., assignor to Tennessee Copper Company, New York, N. Y. A composition for application to plant foliage and fruit for the control of pests which contains zinc sulphite together with an arsenical insecticide.

2,542,061. Powdered DDT Concentrate. Patent issued February 20, 1951 to Charles M. Smith, Silver Spring, Md., dedicated to the People of the United States of America. An insecticide comprising a powdered mixture of DDT and a silica aerogel, said DDT ranging in proportion from about 50 percent to about 99 percent, by weight of the mixture, the aerogel having a bulk density of not more than about nine pounds per cubic foot.

2,542,431. Soluble Fertilizer Applicator. Patent issued February 20, 1951 to Floyd E. Rice, Maricopa County, Ariz. A fertilizer applicator for dissolving fertilizer chemicals in water flowing in an irrigation ditch, comprising, a cylindrical hopper having a conical bottom, a circular valve seat at the bottom thereof, a stationary valve plug rod extending axially through said hopper journalled relative thereto, having means for non-rotary suspension at its top end and a conical valve plug at its lower end, a cylindrical open-bottomed mixing cell attached to said hopper and positioned below said valve plug, adapted to immersion in water flowing in an irrigation ditch, and a turbine surrounding and depending from the exterior of said cell adapted to derive rotary motion from water flowing in said irrigation ditch to rotate said cell and said hopper.

2,543,397. Herbicidal Compositions Containing Esters of Chlorinated Phenoxyacetic Acids. Patent issued February 27, 1951 to William W. Allen, Ambler, Pa., assignor to American Chemical Paint Co., Ambler, Pa. A herbicidal composition containing as an active ingredient at least one ester of an acid of the group consisting of 2,4-dichlorophenoxyacetic acid and 2,4,5-trichlorophenoxyacetic acid with an ether alcohol of the formula $R.O.CH_2.CH_2OH$, wherein R is of the group consisting of methyl, ethyl, propyl, butyl, benzyl, said active ingredient being present in phytocidal concentration.

2,543,838. Fungicidally Treated Multiwall Bag. Patent Issued March 6, 1951 to Frank Raymond Linda, White Plains, N.Y., assignor to St. Regis Paper Company, New York. A multiwall bag comprising a plurality of paper tubes, disposed one within another, said tubes being formed with overlapping edges glued together longitudinally thereof, and all of said tubes being secured together at one end thereof to form a closure, one of said tubes being treated with a fungicidal agent, vaporizable at atmospheric temperatures, and in amount sufficient effectively to inhibit mold growth on goods packaged therein, and one of said tubes being treated with a plastic composition in amount sufficient to render the same relatively impervious to diffusion and escape of said fungicidal agent there-through, said fungicidally treated tube being disposed inwardly of said plastic treated tube.

2,545,431. Method of Killing Weeds and the Materials Used Therein. Patent Issued March 13, 1951 to Paul A. Sartoretto, New York, N.Y., assignor to W. A. Cleary Corporation, New Brunswick, N.J. The method of killing weeds in an active state of growth which comprises applying thereto a herbicidal quantity of an aryl mercury salt of an acid of the class consisting of 2,4-dichlorophenoxy acetic acid, 2,5-dichlorophenoxy acetic acid, and 2,4,5-trichlorophenoxy acetic acid. A composition comprising an aryl mercury salt of an acid of the class consisting of 2,4-dichlorophenoxy acetic acid, 2,5-dichlorophenoxy acetic acid, and 2,4,5-trichlorophenoxy acetic acid, boric acid and an alkanolamine.

Trade Mark Applications

VERT, in capital letters, for fertilizers. Filed Jan. 7, 1949 by Armour and Company, Chicago, Ill. Claims use since 1929.

LEGUME-AID, in capital letters, hyphen between legume and aid which runs on angle, for bacterial inoculants for seeds. Filed Jan. 22, 1949 by Agricultural Laboratories, Inc., Columbus, Ohio. Claims use since October, 1933.

GROMO, in capital letters, for fertilizer. Filed June 24, 1949 by A. D. Adiar & McCarty Bros., Inc., Atlanta, Ga. Claims use since April 6, 1949.

BIO-GRO, in capital letters with hexagon separating words. The hexagon has curving line through center, with one side black and the other side white. There is a dot of opposite color in each area in hexagon. This is for fertilizer preparation. Filed Sept. 27, 1949 by Bioproducts, Oreg. Ltd., Astoria, Oreg. Claims use since June 14, 1949.

VERMACO, in capital letters enclosed in oval outline, the letters increase in size to the center and then decrease in size to the opposite end, for marble dust used for agricultural fertilizing purposes. Filed Sept. 8, 1949 by the Vermont Marble Company doing business as the Vermarco Lime Company, Proctor, Vt. Claims use since July 1, 1916.

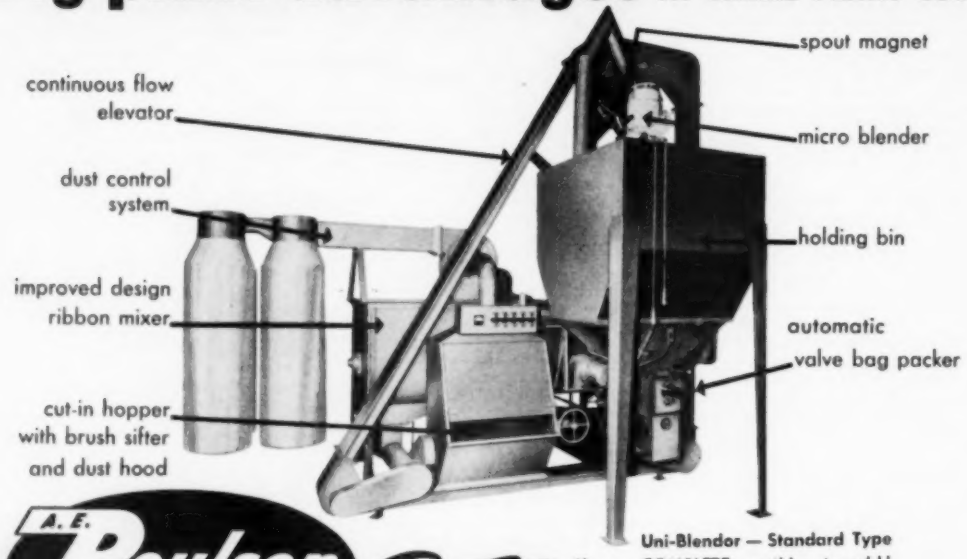
HUMATRO, in capital letters with oval shape, increasing in size toward the center of the word and decreasing in size at the end of the word, for soil conditioning agents. Filed November 3, 1949 by Greengrow, Inc., New York, N. Y. Claims use since October 24, 1949.

COW GRO, in capital letters that are black in the center and outlined with a black line so that each letter has a white border around it, for plant food—namely dehydrated cow manure with peat moss. Filed March 10, 1950 by Jerome K. Feroe, doing business as Mt. Rainier Bulb Co., Seattle, Wash. Claims use since Dec. 7, 1949.

PENN SALT, in capital letters enclosed in a design, the two words being separated by a keystone containing a silhouetted profile of a man and surrounded by a border, the end lines of which slope upward and outward, the top and bottom lines are parallel, for herbicides and insecticides and other chemicals. Filed June 23, 1948 by The Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Claims use since Oct. 11, 1946.

FOR ALL PROCESSES OF INSECTICIDE PRODUCTION

Big plant advantages AT SMALL PLANT COST



Uni-Blendor — Standard Type
COMPLETE... nothing to add!

A. E. Poulsen & COMPANY R.T.R.* UNI-BLENDOR

PATENT APPLIED FOR

The R.T.R. UNI-BLENDOR incorporates all of the advantages of individually designed plants at materially lower cost. The units are designed by engineers who are recognized specialists upon insecticide processing equipment. A type is manufactured for each process of production.

R. T. R. UNI-BLENDOR—Standard Type . . .

Engineered to mix and blend dust concentrates with diluents to produce finished field-strength products of consistently uniform quality. Requiring only 9′ x 12′ of floor space and 13′ of head room, the equipment can be readily and immediately installed in most existing buildings. The Uni-Blendor Standard Type produces up to four cu. ft. batches per hour.

R. T. R. UNI-BLENDOR—Hi-Capacity Type . . .

Designed for the same production process as the R.T.R. Uni-Blendor Standard Type, and producing up to seven 40 cu. ft. batches per hour, is provided for operations requiring quantity production.

R. T. R. UNI-BLENDOR—Dual Type . . .

Engineered to perform a dual function—the formulation of dust concentrates from technical grade toxicants and also the production of finished field-strength products.

Ready to Run . . . *and ready to earn

Each type of R.T.R. Uni-Blendor is a complete, compact, Ready to Run plant—nothing to add. Each unit is plant tested for maximum efficiency and shipped in sections which any mechanic can assemble.

The R.T.R. Uni-Blendor reduces the investment in equipment, eliminates the expense of remodeling buildings, avoids delays of installation, avoids disappointments in operation and production—all of which are frequently involved in specially designed equipment.

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New Books . . .

Chemical Control of Insects, by T. F. West, J. Eliot Hardy, and J. H. Ford. Published by Chapman and Hall, Ltd., London, England, 211 pages, illustrated, cloth binding. While some of the chemical formulas and explanations need a chemical background for complete understanding, the general nature of the book gives an overall view of chemical pest control. The introduction covers various phases of insect control other than chemical and this is followed by a brief study of the insect proper and an outline of methods of pest control. Each of the insecticides is then taken up and covered briefly. The book concludes with a chapter on weed control.

Cotton Production, Marketing and Utilization, edited and published by W. B. Andrews, Agronomist, Mississippi State College and Experiment Station, State College, Miss., 476 pages, illustrated, cloth binding.

This book is a compilation of articles by various specialists covering most phases of cotton production, marketing and uses. It covers cotton varities, breeding, fertilization, cultural practices, insect and disease control, harvesting, ginning, warehousing, etc.

Nonmetallic Minerals, by Raymond B. Ladoo, Consulting Engineer and W. M. Myers, Chief, Division of Mineral Economics, Pennsylvania State College, published by McGraw-Hill Book Co., New York, second edition, 605 pages, illustrated, cloth binding.

The book covers the materials in the mineral kingdom known as nonmetal, which are important in the fields of construction, ceramics, fertilizers and chemical industries. The minerals are listed in alphabetical order with a standard outline.

Plant Growth Substances, edited by Folke Skoog, published by University of Wisconsin Press, Madison, Wisc., 476 pages, illustrated, cloth binding, price $6.00.

This book is a compilation of papers of various authors on growth substances as presented at round table discussions and general meetings September 5-7, 1949 at the Centennial Symposia on Mineral Nutrition of Plants at Madison, Wisconsin. The book is divided into eight sections covering plant growth substances; growth substances in plant metabolism; tissue responses to growth substances; practical applications of growth regulators; growth substances in vegetable developments; growth substances in reproductive development; growth substances in pathological growth; and vitamins and amino acids as growth factors. The papers have been classified to fit these various categories.

An index of chemicals and allied products manufactured and sold by E. I. du Pont de Nemours & Co., Wilmington, Del., and its subsidiaries is compiled in a 260 page book, 8 x 10 inches, bound in a flexible, leatheroid cover. The index is divided into four parts: (1) Departmental Section, containing descriptions of all du Pont products by operating units and subsidiaries. Descriptions of the products include information on use, active ingredients, shipping containers, and division of du Pont or subsidiary supplying the item. (2) Trade-Mark Section, containing an alphabetical listing of the du Pont trademarks. Reference of the item to its description in section one is given. (3) Alphabetical Section, containing an alphabetical listing of du Pont products, with reference to descriptions in section one. (4) Geographical Section, listing the location of offices, plant, and certain stock points.

HERE'S THE ANSWER TO YOUR SPREADING PROBLEMS!

AGAIN!
"The NEW LEADER" leads the field

Commercial Fertilizer Attachment Hood—Two Sizes: 19-foot or 23-foot

with its new
"Motor-Driven Spreader"
offering greater accuracy of spread
with the most positive feed on the market!

SPECIAL ADVANTAGES — Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9', 11', 13' and 15'. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7'-5".

"The NEW LEADER" Self-Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These units have four individual compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft. to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications, prices, etc. Fast delivery service sells fertilizer!

FREE! Write for "The Story of a Custom Fertilizer Spreading Service"

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA
MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS

Innis to Handle Repellents

Innis, Speiden & Co., New York, manufacturers of insecticides, chemicals and gums, have been appointed exclusive distributors for two Goodrite repellents manufactured by B. F. Goodrich Chemical Co., Cleveland, Ohio. The products, *No-Nib'l* for repelling rabbits and *Z. I. P.* for repelling deer have as active ingredient a non-poisonious material that has a very bitter taste which discourages deer and rabbits from feeding.

•

C & C Offers Reprint

Carbide & Carbon Chemicals Division, Union Carbide and Carbon Corp., New York has announced the availability of a reprint of "Herbicidal Properties of Sodium 2,4-Dichlorophenoxyethyl Sulfate" by L. J. King, J. A. Lambreth, and T. P. Finn. The paper is reprinted from *Contributions from Boyce Thompson Institute*, pages 191-208 October-December, 1950 and discusses a new chemical that shows properties of being an effective herbicide. It is non-injurious to plants when sprayed or dusted directly on the foliage at the concentration needed to kill seedlings in the soil.

•

Announce New Paste Mixer

L. O. Koven & Brother, Inc., Jersey City, have developed a new 60 gallon paste mixer. The mixer, made of stainless steel, has a rectangular mixing tank with a half round bottom with inside dimensions of 51" long, 30" wide and 18¼" maximum depth. The tank is steam jacketed for 36" of its length for steam heating. A full-length, stainless steel, spiral agitator with inner and outer ribbons having opposite thrusts is the mixing action. The agitator is driven through a 4 to 1 reducing chain drive at approximately 87 rpm by a 2 hp motor.

•

Meeting Scheduled

The American Society of Agronomy meeting will be held at State College, Pa., on August 13-15, 1951.

Dr. Kotila Dies

Dr. John Ernest Kotila, 58, plant pathologist and mycologist with the United States Department of Agriculture died recently. Dr. Kotila was chiefly responsible for the discovery of a boron deficiency which caused blackening of the tops of sugar beets in Michigan.

•

New Mo. Fertilizer Plant

A new fertilizer plant is being constructed for Missouri Plant Food Co., Inc., near Sikeston, Mo. The plant will consist of a building 90 x 450 feet in size, and is expected to employ from 80 to 100 persons when completed. Executives of the company include L. G. Black, Monroe Hoffman, Earl Day and Rex Morgan, all of Corning, Ark., and Robert Yates, Charleston, Mo.

•

Bemis Manager Dies

Harvey W. Clements, manager of the Chicago general sales division of the Bemis Bro. Bag Co. since 1930, died April 11 in Chicago.

New Nicotine Synergists

Nicotine becomes more effective when it is mixed with polyethyleneglycol derivatives, according to an account in a new bulletin of The Connecticut Agricultural Experiment Station, written by Neely Turner of the Station staff, and Dr. D. H. Saunders and Dr. J. J. Willaman of the Eastern Regional Research Laboratory, Philadelphia.

Research of this type can be used by insecticide manufacturers in producing better formulations of standard insect-killing materials, it says. In this particular experiment, thirty polyethyleneglycol compounds were tested. Of these, five increased the toxicity of nicotine by tenfold or more, while others increased its killing power to a lesser degree.

The tests were made by spraying nicotine alone and nicotine combined with one of the polyethyleneglycol derivatives on common aphids and comparing the results of the two. Tests were also carried on whereby the same materials were injected directly into the blood stream of milkweed bugs. Here, results were entirely different. Little or no increase in toxicity was noted and, in some cases, toxicity actually decreased.

Explaining the difference in results with the two methods of application, the authors state that the polyethyleneglycol derivatives increase the toxicity of nicotine by improving its ability to penetrate the insect cuticle.

They concluded that "the tenfold increase in the toxicity of nicotine applied by spraying with the more effective of these polyethyleneglycol derivatives seems large enough to be of practical value".

Insecticide manufacturers and others interested in improved insecticide formulation can obtain a copy of the bulletin by writing to The Connecticut Agricultural Experiment Station, P. O. Box 1106, New Haven. Ask for it by name and number, Bulletin 543, "The Effect of Some Polyethyleneglycol Derivatives on the Toxicity of Nicotine to Insects."

Materials Handling Show

The Materials Handling Exposition was held at Chicago's International Amphitheatre April 30-May 4, with displays covering some 8 acres. Two hundred and forty companies displayed new models of materials handling devices, including an out-of-door area where trucks and lift conveyors were demonstrated. Included in the exhibit were devices for handling fertilizer materials.

Dust & Fume Control Issue

American Wheelabrator & Equipment Corp., Mishawaka, Ind., has issued a new periodical, "Industrial Ventilation", devoted to dust and fume control. The issue contains illustrated case histories on the application of "Dustube" cloth-tube filters to dust control problems in the fertilizer and other industries. Subsequent issues will present more data on dust and fume control in the industry. Copies are available upon request.

Aldrin Goes to Iran

Drums of aldrin being loaded on plane for shipment to Iran for grasshopper control.

A 13-ton load of aldrin was sent via air to Iran to help control the record infestation of locusts in that country, it is reported by Julius Hyman & Co., Denver, manufacturers of the material. The cargo, numbering 73 drums weighing about 384 pounds each, was loaded at Denver and flown some 7,500 miles to Tehran. The insecticide was shipped in the form of a concentrate to minimize transportation expense.

Word from Iran indicated that a total of some 139,000 square miles was infected by the locusts which were described as being in the greatest number seen in 70 years. Adult locusts were apparently coming into the country from Pakistan, but many were starting to hatch in Iran, (some being in the second and third nymphal stages) .The territory involved is said to be most of the fertile southeastern Iran area bordering the Persian Gulf. Crops grown there include grains, vegetables and nuts.

The two C-54 transports, contracted by the Government to carry the toxicant, also carried six light planes equipped for applying insecticides. The smaller planes were regarded as being more suitable for the hilly Iranian terrain.

Dr. John Hardy, director of one of the argicultural research laboratories of Shell Chemical Corp., New York also flew to Iran to aid in the fight against locusts, it was announced by the company. Dr. Hardy will help direct the application of the insecticide.

•

Error is Noted

In our January issue, page 67 of Technical Briefs, credit for distribution of a systemic insecticide called "Pestox 3" in Britain and France was given to Imperial Chemical Industries, Ltd. We have been corrected in the matter by Pest Control Limited, Harston, Cambridge, who are the distributors of "Pestox 3". They also inform us that it was marketed to more than a limited extent.

•

Bemis Has New Plant

Bemis Bros. Bag Co., St. Louis, has announced the completion of a multiwall plant and storage facilities at Peoria, Ill. The new building and storage space measuring approximately 330 x 200 is in addition to the company's multiwall paper shipping sack manufacturing plant in Peoria.

HART

(*Continued from Page 57*)

terials.

I am confident that industry will measure up to its responsibilities in 1951. I am sure that no farmer will find it necessary to forego chemical protection of his crops or livestock, although he may not in all instances be able to obtain precisely the material desired. Yet we may be sure that satisfactory alternates will be available for whatever materials may be in short supply.

This is the challenge to our industry in 1951. We must be prepared to meet it, and I am confident that we will meet it. And as we do meet this challenge, once again industry will demonstrate (as it proved during World War II) that the manufacturers and distributors of agricultural chemicals have the "know-how", the productive capacity and the dis-

tribution system to provide the protection American agriculture must have against insects, diseases and other pests.★★

NACA MEETING

(*Continued from Page 44*)

ganic insecticides which do a much more effective job but also bring about additional problems not dreamed of before. Among these are effective formulations, compatibility of active ingredients and diluents; storage; and the corrosion and bulging of containers under some conditions. Solution of such problems can be worked out only by the close cooperation of all concerned, he said.

Allocations Soon

STATING that allocations on certain chemicals would become effective around May 1, L. N. Markwood, of the Chemical Division of the National Production Authority, Washington, D.C. told the group on April 6 that sulfur would be among the first items to be allocated. On the other hand, he said, sulfur may be controlled without allocations if it seems possible to handle it in this manner. Mr. Markwood quoted sulfur figures from the Bureau of Mines showing how production of the element had decreased during the past year while the demand had exceeded that of any other year on record. Stockpiles of the material are now reduced to a maximum of 5 to 6 months, he declared, which represents the smallest inventory seen in many years. One unknown factor, however, is the amount of sulfur now in the hands of consumers. An estimate of this which he described as a guess, may be around 500,000 tons; a relatively small amount.

"It is absolutely essential that all consumers of sulfur conserve what supplies they receive until remedial measures now projected can restore equilibrium", he emphasized. "The insecticide industry can very definitely assist in this conservation program by keeping to a minimum the sulfur content of fungicidal dusts and also by discouraging the use of sulfur

where there is not sure indication for its need." he continued.

Mr. Markwood pointed out also that the U.S. Department of Agriculture joins the NPA in making this request. "Evidence of the government's serious contemplation of the problem is shown by the cutback on sulfur exportation whereby a ceiling of about 25% below last year's shipments was placed on export licenses for the first quarter of 1951."

Reviewing the problem surrounding defense orders of DDT, Mr. Markwood explained the meaning of the 25% limitation written into Order M-32. On the basis of estimated total output of 5 million pounds of DDT per month, it was calculated that 25% of each producer's production during February and March would cover defense orders.

Recalling that some misunderstanding had arisen over the meaning of this percentage, Mr. Markwood explained the process as follows: "Order M-32 does not require that a producer shall mentally set aside or physically hold in reserve 25 percent of his output in anticipation of defense orders. The order requires only that if and when DO's are received, the producer must accept them up to 25 percent of his output. If he finds himself with less than this percentage of DO's, he is free to dispose of the remainder at his discretion."

A meeting of the industry advisory committee on March 21 brought out the fact that defense orders of some 4 million pounds of DDT were to be met by June 30, a figure which enabled the group to calculate that a 20 percent limitation would suffice for the months of April, May and June. Order M-32 was subsequently amended accordingly, he said.

Functions of NPA are to see that production for the defense effort is maintained on a high level, Mr. Markwood explained. The first year of the current emergency may be the worst, he predicted, since many of the shortage problems in chemicals will be alleviated by the end of 1951. "By that time, expansion programs will be well along and deficiencies in various categories should be disappearing," he declared.

Cedric Gran, chief of the agricultural and chemical fertilizer section of the Office of Price Stabilization, Washington, D.C., said that all price controls may be removed by July first, providing there is no worsening of the international situation. He pointed out that the defense production act expires June 30 and it is doubtful if there will be time for the Congress to reinstate it. Mr. Gran, connected with the Mathieson Chemical Corporation of Baltimore, has been loaned to OPS by the corporation. His talk was a feature of the program of Friday morning April 6.

Lea S. Hitchner, NAC executive secretary, Washington, warned the group that the Federal Trade Commission has men in the field checking inventory controls of industry, and added that there is no way of knowing in advance of the arrival of such inspectors. He reviewed the history of the Delaney committee hearings in Washington, pointing out that although the record lacked a complete statement of the industry's viewpoint, representatives of the U.S. Department of Agriculture to testify upon resumption of the hearing in April, would probably add some authoritative data to the record. (The Committee had refused to admit Mr. Hitchner's prepared statement earlier in the hearing).

The meeting terminated with president Hart commending the group for its attention and consideration.

On the recreational side, the conventioneers found time to take in a water ski show, swimming, sun bathing, as well as side trips to interesting points in the Miami area. (See "Meeting Sidelights" story.)

APFC MEETING

(*Continued from Page 53*)

Robert A. Wall, vice-president, National Vocational Agricultural Teachers Association.

A brief business session at which eight new members of the

Board of Directors will be elected, is scheduled for Saturday morning at 11:45 A.M.

Judd Banquet Speaker

REPRESENTATIVE Walter H. Judd (R-Minn.) will be the banquet speaker Saturday evening, June 16. His subject will be "Danger Signs in Our Domestic Economy." A graduate of the University of Nebraska, where he earned his B.A. and M. D. Degrees, Mr. Judd is widely known as an authority on American foreign policy. He was elected to the 78th, 79th and 80th Congress. During World War II he entered the United States Army as a private and was discharged as a Second Lieutenant in the Field Artillery.

A meeting of the Board of Directors of the Council is scheduled for June 17 at which time the Executive Committee and Committee Chairmen will be elected.

Entertainment features of the convention will include the annual golf and tennis tournaments and special events for the ladies. Committees for the 1951 sessions are as follows:

Credentials—J. C. Crissey, president, G.L.F. Soil Building Service, Ithaca, New York, chairman; John R. Riley, Jr., vice-president, Spencer Chemical Company, Kansas City; Mrs. W. B. Hicks, president, Wilson & Toomer Fertilizer Company, Jacksonville, Florida.

Golf—Dean R. Gidney, United States Potash Company, New York, chairman; C. F. Burroughs, president, F. S. Royster Guano Company, Norfolk, Va; R. B. Lenhart, G.L.F. Soil Building Service, Ithaca, New York; W. F. McLane, Lyons Fertilizer Company, Tampa, Florida and John A. Roberts, Pioneer Phosphate Co., Des Moines, Iowa.

Tennis—Alfred J. Dickinson, Virginia-Carolina Chemical Corp., Richmond, Va., chairman; Benjamin H. Brewster, Jr., Baugh & Sons, Baltimore, Md. and William J. Rabel, American Cyanamid Co., New York City.

Hospitality—Fred J. Woods, president, The Gulf Fertilizer Company, Tampa, Florida, chairman; John Hall, Potash Company of America, Washington, D. C.; R. F. Boynton, United States Potash Company, Atlanta, Ga.; Roy F. Camp, Chilean Nitrate Sales Corp., New York City; W. B. Copeland, Smith-Douglass Company, Inc., Norfolk, Va.; J. D. Stewart, Jr., Federal Chemical Company, Inc., Louisville, Ky; G. Tracy Cunningham, Armour Fertilizer Works, Atlanta, Ga; Dr. S. F. Thornton, F. S. Royster Guano Company, Norfolk, Va. and E. M. Kitchen, Pacific Coast Borax Company, Beaver Dam, Wisc.

Ladies—Mrs. J. D. Stewart, Jr., Louisville, Kentucky, chairman; Mrs. Horace N. Albright, New York city; Mrs. Harvey B. Caldwell, Greensboro, N. C.; Mrs. L. Dudley George II, Richmond, Virginia; Mrs. John E. Sanford, Atlanta, Georgia and Mrs. G. A. Woods, Raleigh, North Carolina.

HERBICIDES

(*Continued from Page 45*)

the nitro groups are in other positions.

Selective Systemics

THE next group is the seletive systemic herbicides. 2,4-dichlorophenoxyacetic acid is probably the outstanding example of this type of compound. A small amount of chemical placed on a plant is absorbed into the system and transported to other parts of the plant, resulting in a general collapse of susceptible plants. This is the reason for calling it a systemic material. They are also commonly called plant hormones or plant growth substances.

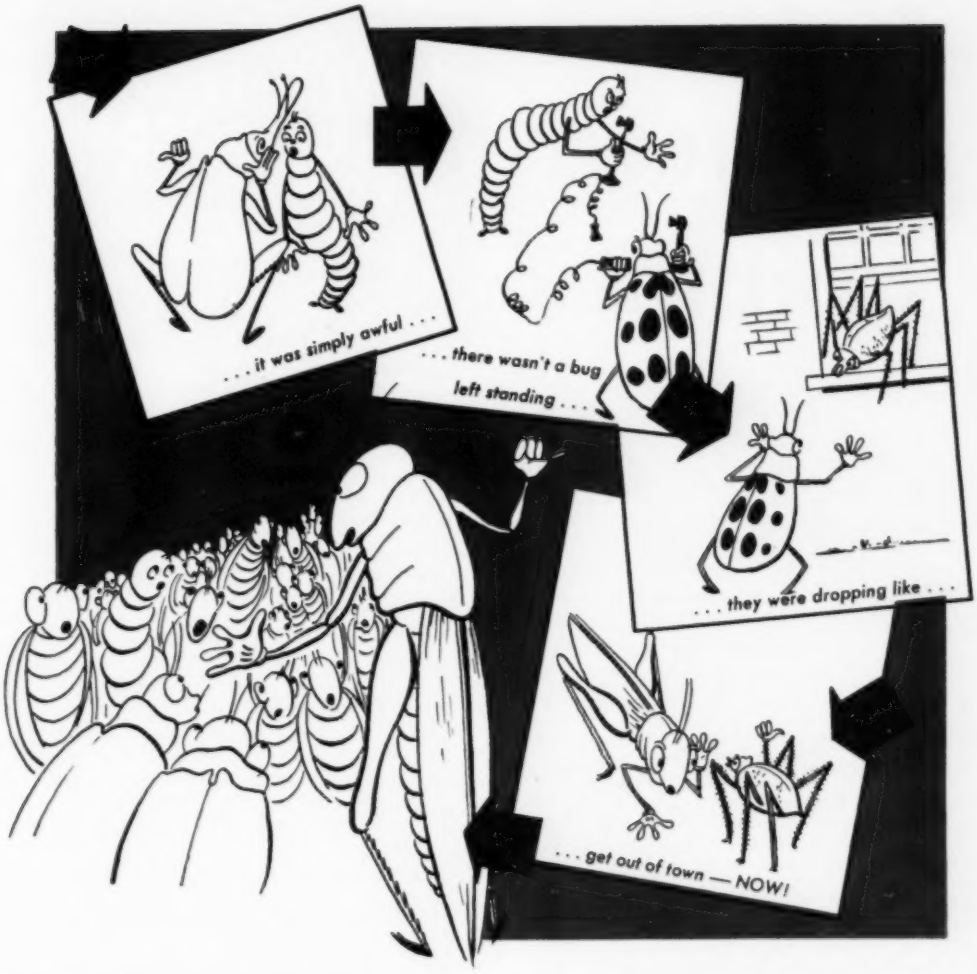
The use of 2,4-D as an herbicide, probably resulted from intensive action by the U. S. Department of Agriculture and a number of agricultural colleges and universities to supply a plant killer for use by the army. The Chemical Warfare Service supported much of the work that resulted in bringing 2,4-D to use. In fact, the first production of 2,4-D, to the writer's knowledge, was for an order by the Chemical Warfare Service. It did not take long to recognize the possibilities of using this

chemical to control weeds in lawns and then, in farm crops. 2,4-D-dichlorophenoxyacetic acid is manufactured from 2-4 dichlorophenol and the sodium salt of monochloroacetic acid. It is a comparatively simple reaction. The formulations are principally amine salts which are soluble in water. The alkanolamines and the alkylamines have all been used successfully.

One of the first problems encountered in offering these formulations on the market was the effect of hard water which caused plugging of spray nozzles and machine pumps. This was overcome by the use of sequestering agents of various types which threw the calcium and magnesium ions into a complex which would not result in a precipitate or curd. Esters of 2,4-D dissolved in emulsifiable oils are also used extensively. Earlier, 2,4-D was applied at the rate of 1 to 2 pounds per acre in 80 to 120 gallons of solution. It is now almost standard practice to use from 4 to 8 ounces of the chemical per acre in 5 to 10 gallons of water for selective spraying in crops, whereas 3 to 4 pounds per acre is used for brush control. The low gallonage applications resulted in the development of a large number of low-pressure, low-volume spray applicators. These sprayers also had the advantage of being much lower in cost than the standard high-pressure, large-volume spray machines. A high-pressure machine costs several thousand dollars, where some of the low-volume, low-pressure machines are sold as low as $150.00 to $200.00. Another chemical in this class which was developed in England and used extensively there because of their supply of ortho-cresol is 4-chloro-2-toloxy acetic acid. As yet, this material has not had too much use in the United States although apparently it may have a number of specific uses.

Soon after 2,4-D was developed, a number of tests were run on 2,4,5-trichlorophenoxyacetic acid which is manufactured from 2,4,5-trichlorophenol and the sodium salts of monochloroacetic acid. Other isomers of trichlorophenol have been tried, but none of them have the potency of the 2,4,5-trichlorophenol derivative. This chemical has a number of specific uses in the agricultural field, but its principal application is for the control of undesirable brush on farms and utility rights-of-way. Earlier, the isopropyl ester, the ethyl ester, and others were used in oil solution for application to brush and woody plants. Generally, in brush work, it is desirable to use a larger volume than in control of weeds in grain. Although 80 to 100 gallons are desirable, it is possible to use low gallonage, and as further experience is gained, airplanes are likely to be used to control brush successfully.

Because of the volatility or claim of undesirable effects due to the volatility of a number of alkyl esters of 2,4-D and 2,4,5-T, much work was done to develop lower volatile esters. As a result, a number of new lower volatile esters are available, and they do have more effective-



Run for your lives. Travel light. Leave everything behind. I've just gotten the word from the boys. They say the bugs down the road a piece never had a chance.

They were wiped out in their tracks by farmers who swooped down on 'em armed to the teeth. They're all using Geigy's dusts and sprays — the most potent pesticides you bugs have ever seen.

Well, so long, boys. See you sometime, somewhere, maybe.

ORIGINATORS OF Geigy **DDT INSECTICIDES**

GEIGY COMPANY, INC. **89 BARCLAY ST., N. Y. 8, N. Y.**

Aberdeen, N. C.; Burlington, Iowa; Colorado Springs, Colo.; Elkton, Md.; Fresno, Calif.; Houlton, Me.; Leland, Miss.; McGregor, Tex.; Orlando, Fla.; Walla Walla, Wash.

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Your Insurance for *better* Crops!

CORONA

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- ARSENATE OF LEAD
- MICRONIZED 50% WETTABLE DDT
- MICRONIZED WETTABLE and DUSTING SULFURS
- TREE WOUND DRESSING
- COROTHION (15% Wettable Parathion)
- CORONA "26" (Tri-Basic Copper Sulphate)

CORONA
AGRICULTURAL DUSTS

Protect vegetable crops with finely ground, carefully formulated and blended dusts, embodying such well known ingredients as BHC, Calcium Arsenate, DDT, Parathion, Rotenone, Toxaphene, Tri-Basic Copper Sulfate, Sulfur, Carbamates (Coromate, Corozate, Dithane). Use Corona for best results.

See your dealer or write for full information about Corona's New Brush and Weed Control Chemicals.

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PITTSBURGH PLATE GLASS COMPANY
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NOPCO* 1219-A EMULSIFIER
–for liquid insecticides that are all-out killers

Insecticide formulations that can be applied as liquids are proving not only more easy to use and less wasteful, but most *efficient as killers.*

You'll find Nopco 1219-A our specifically developed emulsifier for Toxaphene, Chlordane, BHC and Aldrin gives concentrates that are *unsurpassed.*

Consider these outstanding advantages:

GOOD EMULSIFIABILITY: Nopco 1219-A is a 100% active blend of chemicals that gives a very high degree of emulsifiability of Toxaphene, Chlordane, BHC and Aldrin.

ANTI-CORROSIVE PROPERTIES: Nopco 1219-A has the unique property of inhibiting deterioration of concentrates packaged in metal containers—a valuable factor when drum linings become chipped in transit.

HARD AND SOFT WATER RESISTANCE: Compounding with Nopco 1219-A assures both hard and soft water emulsion stability—with effectiveness up to 2000 p.p.m. of hardness.

STABILITY: Insecticides compounded with Nopco 1219-A are highly stable to acidity of the toxicants when in concentrate form. And the versatility of Nopco 1219-A permits preparation of either quick-breaking emulsions or permanently stable emulsions.

LOW COST: The low cost of Nopco 1219-A permits economical production of superior, long-life insecticides that do a *quick* and *complete* job of pest elimination.

Full information, including formulas, is yours for the asking . . . and remember, our Technical Service stands ready to help you solve any specific insecticide formulation problems.

*Reg. U. S. Pat. Off.

NOPCO

EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY
Harrison . . . . . New Jersey

ness in controlling a number of brush species. The polypropylene glycol butyl ester of 2,4,5-T is considerably more effective in controlling hard-to kill woody plants than are the common alkyl esters. The market for control of weedy vegetation is fairly large but does not compare with the control of weeds on agronomic crops. Recently, the USDA and the Texas Experiment Station have announced recommendations for the control of mesquite. There are approximately 76 million acres of mesquite and years of work have been done to find an economic control. It is quite possible that this may be accomplished with these newer esters of 2,4,5-T.

Another classification of herbicides are those which kill or control undesirable grasses. One of the remarkable new chemicals to come on the market was sodium trichloroacetate, commonly called sodium TCA. This material, used at 50 to 100 pounds per acre, will control Johnson grass, quackgrass, and other perennial grasses. When used in lower quantities, such as 4 to 8 pounds per acre, it will control annual grasses in crops such as sugar beets without materially affecting the beet crop. Its action is systemic.

RESEARCH

(Continued from Page 51)

sweetpotatoes, vegetables, and other crops. The golden nematode of potatoes is a serious menace to potato production on Long Island. And many of the country's sugar-beet growing regions are infested with the sugar-beet nematode.

Experimental and commercial application of soil fumigants in nematode infested soils have resulted in substantial yield increases with a variety of crops in many locations. Recent tests have shown that nematodes are an important factor in crop production over a much larger area than we have suspected. Experiments with fumigants in many areas where we have no previous knowledge of nematode infestations have produced yield increases of more than 20 percent.

Chloropicrin and methyl bromide are used primarily in greenhouses, nurseries, and seedbeds. Field fumigation has been made possible by the recent discovery that less expensive chemicals, such as dichloropropene and ethylene dibromide, are effective and that strip, row, site, or spot fumigants often give adequate control.

Even these cheaper chemical treatments cost $35 to $40 per acre. Therefore, their use is limited to high value crops such as tobacco, sugar beets, and vegetables. About four million acres of crop land in the United States may be classed as producing crops of sufficient value to pay reasonable returns for soil fumigation. Experimental evidence indicates that soil fumigation would be profitable on at least three-quarters of this land. The best available estimates indicate that enough fumigant is now being manufactured to fumigate only about 150,000 acres—one-twentieth of the potential area. And

a substantial quantity of the available fumigant will probably be used for pineapple production in Hawaii.

While the field of nematods control even now is a big one, the real potentialities rest with extending economical soil fumigation to lower valued crops such as cotton and peanuts. Cotton, for example, is being grown on more than 25 million acres this year, and nematodes are a serious problem over all of this area. Experimental evidence indicates that substantial yield increases can be realized from fumigating soil for cotton production, but the practice is not economical at present prices. A fumigant that can be applied for $20 an acre would probably be used extensively for cotton production in California. One that could be applied for $10 an acre would be economical over most of the cotton belt. If such chemicals can be developed, they will open the way for substantial increases in food and fibre production.

The use of chemicals in preserving crops and for improving crop quality is another field that has received considerable scientific study during recent years. Extensive use is being made of chemicals to protect fresh fruits and vegetables from disease damage during transit and storage. Chemicals such as borax, sodium ortho-phenylphenate, and chlorine compounds are used in washing most citrus fruit to prevent decay. Sodium chloro phenylphenate is used for controlling decay in apples and pears from the Northwest. Sulfur dioxide is used in fumigating grapes to protect them against rot during transit and storage. Copper impregnated wrappers are used for controlling grey mold rot on pears. Waxes (mixtures of paraffin and carnauba) are used to retard water losses from potatoes, cucumbers, rutabagas and various other vegetables.

As a result of chemical treatments, marketing losses are being reduced, nutritional values preserved, keeping quality improved, and the marketing season extended for many fresh fruits and vegetables. Furthermore, thousands of new chemicals are being tested in current transportation and storage studies. For example, nearly 2,000 organic compounds have been tested, searching for better measures of controlling citrus decay. About 50 of them have promising antiseptic qualities.

A wide variety of effective treatments has been worked out for horticultural crops. Commercial plant propagators are using plant growth regulators to induce rooting on hard-to-root cuttings. Fruit growers are using them to prevent apples and pears from dropping to the ground before they are ready to pick. Pineapple growers are using them to stagger their harvest periods.

Other chemical treatments can be used to prevent potatoes and onions from sprouting in storage, to hasten the ripening of certain fruits, and to reduce hand labor in the production of some horticultural crops. Chemical thinning of apples, for example, is becoming a commercial prac-

tice in the Pacific Northwest. Last year about 20,000 acres of apple orchards were thinned with spray applications of dinitro at blossom time. Our experimental studies show that chemical apple thinning gives a 15 percent increase in yield for only a fraction of the cost of hand thinning.

Defoliating Chemicals

IMPORTANT progress has been made in the use of chemicals for defoliating crops, especially cotton. Several different chemicals have been found to be effective in getting leaves to drop from cotton plants before picking time, thus helping to prevent boll rots, retarding deterioration of fiber and seed, expediting hand picking, and increasing the efficiency of mechanical picking. Last year, defoliating chemicals were applied to more than 1½ million acres of cotton—about 8% of the crop.

Still, there are many problems with cotton defoliation yet to be solved. So far, completely satisfactory materials for all arid and semi-arid conditions, are lacking. Calcium cyanamide does a good job in humid areas where dew is common. None of the defoliants so far discovered, however, are fully effective in the absence of dew. The current trend is toward the development of specialty defoliants—materials that are effective during different stages of plant maturity and under a variety of weather conditions.

A considerable increase in the demand for cotton defoliants may be expected because of the manpower shortage. The availability of chemical materials will have an important influence on the rate of expansion of cotton defoliation in the immediate future. Every defoliant so far developed is keyed to such critical materials as nitrogen, chlorine, sulfur, and phenol. Furthermore, the use of these chemicals on other crops will compete with their use on cotton. For instance, some kind of defoliating material will be needed this year on about 45,000 acres of castor beans—a new crop in American agriculture.

Interest is developing in the use of chemicals to improve quality with a wide variety of crops. Some potato growers are using cyanamide and other chemicals to kill disease-infested vines before diseases move into the tubers. Earlier ripening of tomatoes has been obtained through the use of chemical compounds to reduce leaf shade. Research men working with sugarcane are searching for a chemical solution to leaf problems in harvesting that crop.

New Application Equipment

MODERN speed sprayers and boom equipment have speeded up field spraying and dusting and increased operating efficiency by reducing labor costs. Soil fumigation on a field basis would be impossible without recently devised tractor-drawn equipment to eject the chemical below the surface of the soil. Non-selective herbicides on such crops as cotton and onions could not

be used without sprayers designed to control chemical placement. Protective shields and hoods have only recently been perfected to direct a spray pattern so that weeds between rows can be covered without wetting crop plants.

The discovery and exploitation of the principle of low-gallonage spraying for weed control has been highly significant. Without low-gallonage spray equipment, the field spraying of 30 million crop acres for weed control last year would have been economically impossible. The new equipment permits uniform herbicidal spraying with less than 5 gallons of carrier per acre compared with 50 gallons and more for old-type sprayers. Airplanes with a spray tank capacity of 150 gallons can spray 30 acres or more with each load. With old-type equipment, which permitted spraying only 2 or 3 acres per load, airplane spraying was uneconomical under many farm conditions. A weed control spray job of the size undertaken last year involves handling about ¾ million tons of carrier with low gallonage equipment. With old-type equipment using 50 gallons per acre, it would have required the handling of more than six million tons of carrier to do the same job!

Good progress is being made in extending the same principle to spraying insecticides and fungicides. Engineering studies with spraying DDT for corn borer control show that improved spray nozzles permit effective control with as little as ten gallons of carrier per acre instead of 70 or 80 gallons needed with old-style nozzles.

There are promising possibilities, too, for combining chemicals to do more than one pest control job from a single application. Farmers in southeastern States are already using soil treatments combining cyanamid and urea to control both weeds and fungus diseases in tobacco plant beds. Investigations are under way with combinations of insecticidal, fungicidal, and herbicidal materials. The development of organic nitrogen has made it possible to combine pesticides with nitrogen for certain foliage applications.

Science so far has made but a small beginning in developing chemicals as a farming tool. In last year's screening tests for plant growth regulating activity, for instance, more than a hundred new compounds were found to be sufficiently active to warrant further study. Thousands more are waiting to be tested, and even more are being compounded.

Exploratory studies with various new chemicals suggest a wide range of possible new agricultural uses. For example, chemicals have been found that make plants hold water longer after they have been treated and harvested. These findings raise the question whether chemical means might be perfected to make plants resist drought.

Plant materials have long been used as a source of such insecticides as nicotine, rotenone, and pyrethrum. Now, the use of plant materials as

a source of plant hormones is being investigated. Initial studies have indicated considerable stimulation of plant vigor from their application.

In conclusion, four points should be emphasized: *First*—Through recent research a tremendously *wide range* of practical farm uses for chemical materials have been developed. Consequently, agricultural chemicals in agriculture are essential to meeting present and future food needs.

In addition to herbicides, fungicides, soil fumigants, and chemicals for retaining and improving crop quality, spectacular advances have been made in the field of insect control, and in the application of chemical fertilizers in crop production. In total, new developments with chemicals represent one of the most important recent advances in modern farming.

Second—We have made but a small beginning. Experimental studies now under way promise hundreds of additional new uses, tailor-made to meet specific problem conditions.

Third—The *newness* of certain chemical developments in agriculture should be underscored. Many modern uses have been perfected since World War II. In my opinion, the potentialities of chemicals in agriculture at this time are comparable to those typified by hybrid corn fifteen years ago.

The *final point* has to do with capitalizing on these potentialities. Farmers will need huge quantities of chemical materials if the nation is to realize full benefit from our new discoveries. Arrangements must be made for shifting and expanding the production of chemicals as needed. Historical records of agriculture's past use of chemicals are woefully inadequate as a yardstick for measuring future needs.

SIDELIGHTS

(*Continued from Page 39*)

share of customers. There were no steeds running named "DDT" or "Benny Hex", but there was lots of conversation in the stands that must have been rather mysterious to the regular cusomers, in between trying to pick the next winner.

Your reporter, being one-third owner of a one eyed race horse, felt constrained to join the horse followers on several occasions, having a natural interest in seeing what other folks are doing with their so-called thoroughbreds. We can advise Sen. Kefauver that it doesn't seem like gambling at Gulfie, and perhaps it really isn't.

* * *

Captain of the horse track team was Pittsburgh Bill (Handicapper) Houde. Bill Merritt, Paul Betts and Jack Moore also won minor awards, the latter three being followers of your agent's special system for beating such tracks as Gulfstream. Winner of a number of used mutuel tickets, was Paul (Plunger) Mayfield.

* * *

Speaking of systems, the co-inventors of the famous Maughan System for beating the dog tracks, Frankie Maughan of R & H, and his brother, Doug, of Cal-Spray, were both present. Their secret weapon is to grab a quinella in each race on the 1-2 combination, while secretly betting the No. 5 dog in the straight pool. This was the devasting formula that killed the Tampa track at last year's AAEE meeting, but it did no more than paralyze Miami. And this agent's variation on the system didn't work at all. Ed Phillips got into the combination just the wrong night.

* * *

What can you think of more incongruous than Rus Stoddard and Dr. Haller trying to dope out the winner of the ninth race at the dog track, —a 2,016 ft. gallop for worn-out greyhounds? The answer could possibly be Hyman's Newt Hall and Van Winkle, chaperoned at this session by their attractive wives. It was remarkable, incidentally, what the Florida convention site did to build up the feminine attendance. Two other Denver couples to attend were the M. H. Rosemans and Phil Mozer, (Chem. Corp. of Colorado) advertising Champions of Ag. Chemical's biggest issue so far.

Though the Flamingo is not a beach front hotel, the managers have done the next best thing in bringing the beach to the hotel. There was a generous sand beach around the outdoor pool, and with Mrs. Hart as the lady lifeguard, and Cyanamid's cabana handy for refreshments, the pool was a popular spot the moment the meeting sessions ended.

* * *

The ladies, wives of conventioneers, were having a wonderful time for themselves on the beach, dancing at the hotel in the evening, and taking advantage of the entertainment provided by the ladies committee. This committee, incidentally, did an outstanding job of keeping the ladies well occupied. Headed by Mrs. J. K. Sparkman, the remainder of the committee included Mesdames Rager, Bellows, Hart, Leonard and Hitchner.

* * *

Here, incidentally, is one association that seems able to run a successful meeting without carding addresses from eight in the morning until six at night. They concentrate the general open sessions into the mornings, leaving the afternoons free for the special work of committees, and for the thousands of little informal sessions where people accomplish the things they really came to the meeting to do.

* * *

One thing this reporter never got around to checking on was the display of "rare tropical foliage" which was supposed to be on exhibit out the door just beyond the bar. But nothing in the way of tropical foliage would surprise us. No, nothing, not after viewing the tropical foliage that Gus Ashcraft has grown. Folks, he has a mustache that Capt. Kidd himself would have envied!

* * *

"WANTED" circulars are out for Byron Webster for breaking the lady photographer's camera. And, we might add, he was guilty of another misdemeanor in neglecting his usual lifeguarding chores. He'll have to do better at Spring Lake, or your agent will insist on appointment of another assistant lifeguard.

* * *

Ex-prez. Grub Leonard was on hand as usual,—complete with his white shoes, celebrating his birthday, or Mrs. Leonard's, or someone's. But we missed Henry Wood, who will have to give an account of himself at Spring Lake. Bill Andrews too.

* * *

The "Toxaphene Special", Hercules Powder Company's specially equipped DC-3, made the flight to Miami from Wilmington, with Hercules executives Yates, Mayfield and Rapp playing host. Two miles up in the air, breathing oxygen - there seems nothing at all strange in playing seven card stud, high-low, three cards down, four up, with your low hole card wild. And sometimes the one-eyed Jacks too. And how that Doc Alexander understands the game. All needed to make "poker in the sky" complete was Len Gopp.

* * *

One of the most uncrowded trips on record was enjoyed by conventioneers leaving New York on the "Orange Blossom" April 2. Originally scheduled as a special train, but later changed to a regular run, only 60-odd persons were rattling around

in the 14-car conveyance. And of these, all but four or five were headed for the convention. The club car, looked like a pesticide convention itself, with well-known trade personages on deck such as John Rodda, U.S.I.; "Buck" Francis, Pennsalt; Jack Moore, Floridin Co.; Don Starr, S. B. Penick & Co.; Cy Haas and Bob Wert, Attapulgus Clay Co.; and Gordon Utter, Phelps-Dodge Refining Corp.

Miniature belle of the train was Linda Fuestel, daughter of the Bill Fuestels, R. T. Vanderbilt Co. Linda, about 5, seemed to be enjoying herself greatly. Others noted here and there on the train included Russ Dorman, Calif. Spray Chemical Co.; Ray Byrnes, Rohm & Haas, L. M. Markwood of NPA; Pete McManus, GLF; Friar Thompson, Prentiss Drug & Chemical; Mr. and Mrs. Russell Stoddard, U.S.I.; Mr. and Mrs. Harold Noble, S. B. Penick & Co.; John H. Kennedy, Stauffer Chemical Co.; F. A. Lucard, Pennsalt; Mr. and Mrs. J. V. Vernon, Niagara Chemical Div.; Mr. and Mrs. Jack Miller, Atlas Powder Co.; Fred Shanaman, and Kenneth Krausche, Pennsalt; Wally Moreland, NAC; Mr. and Mrs. Al Weed, John Powell and Co.; Ed Phillips, GLF; T. W. Brasfield, U. S. Rubber Co.; Ed Georgi, United Cooperatives; Carl D. Fischer, Carbide & Carbon Chemical Co.; Howard Grady, Calspray; and L. G. Matthews, American Smelting & Refining Co. Relaxing after a long siege of arranging rail tickets for the group, was J. I. Shafer, B. G. Pratt Co., who looked plainly relieved that the battle was over.

With such a light load, the train dieseled into Miami a few minutes ahead of time! The trip was not only light, - but dry as well. No bar service beyond Washington!

FUNGICIDES

(*Continued from Page 61*)

field on April 21 using a Model No. 300 Planet Jr. drill with each treatment replicated four times. Plots of 200 seedlings each were staked out on May 25 when the majority of the plants were from two to three inches tall. Smut-affected seedlings were noted at this time but no dead plants were evident until three weeks later. Counts on apparently smut-free plants were made on June 22 and August 2, and final data on smut-free bulbs at harvest on September 8.

The data in Tables 1 and 2 show that technical thiram: (1) was somewhat less phytotoxic at the two lower dosage levels than "Arasan" regardless of the age of the seed, (2) gave significantly better smut control than "Arasan," "Arasan SF," and "Tersan" at all concentrations, and (3) did not interfere appreciably with the rate of seeding except at the highest concentration (see "Mean no. of feet of row — 200 plants" in Table 2).

The pellets resulting from treatment with technical thiram at 50% and 75% dosage levels were smoother and harder than those incorporating "Arasan" or "Tersan".

HAZARDS

(*Continued from Page 37*)

If, in handling, a quantity of a hazardous, absorbable chemical is spilled accidentally on the clothing, the individual should immediately strip off all clothing and bathe in warm water, using soap. The advice of a doctor should be secured promptly. Supply the doctor with the chemical name of the active ingredient stated on the label, not the brand name, since this has no meaning to the doctor. To prevent the accidental spilling of chemicals on the clothing, it is wise to wear rubber coats, hats, gloves, and boots.

When emptying packages of wettable powders of hazardous chemicals, such as parathion, into the spray tank, a dust mask or respirator should be worn. Respirators approved by the U. S. Bureau of Mines which protect against dust and organic vapors are:

1. Mine Safety Appliances Co., Pittsburgh 8, Pa. Chemical Cartridge Respirator No. CR-45779
2. Willson Products Co., Reading Pa. Chemical Cartridge Respirator No. 701
3. American Optical Co., Southbridge, Mass. Chemical Cartridge Respirator No. R-5055

If a dust-mask is used, the filters should be changed twice a day; if a gas-mask is used, the cartridge should be replaced after eight hours of actual use.

During the actual spraying or dusting operation, the operator is exposed not only to skin contact, but also to the possibility of inhaling liquid, solid, or gaseous particles. Therefore, if the chemical is known to be dangerous on contact or by inhalation, protective rubber or rubber-coated clothing should be worn, as well as a dust-mask or a gas-mask. The dust-mask is lighter and more comfortable to wear than a gas mask. If no poisonous gas is involved, a dust-mask will give sufficient protection. In actual dusting operations of this sort, a dust-mask should be worn even though the dust fabrication contains no ingredients reported to be toxic to man. Thus, hydrated lime is regarded as practically non-toxic by ingestion but can produce serious damage to the lungs if inhaled in quantity. Similarly, some totally inert powders with no chemical toxicity whatsoever, may produce lung damage merely by their physical presence in the lungs. Such a phenomenon was common earlier among hard-rock miners, caused by inhalation of silica dusts.

Goggles, to protect the eyes, are advisable in many types of applications and are absolutely essential in others. Sulfur dust is particularly irritating to the eyes. If the eyes are not protected by goggles, they become lacrimose to the point of complete impairment of vision. The best method of combatting sulfur irritation to the eyes consists of washing the eyes

with several changes of whole cow's milk, using an eye-cup.

Certain phosphate compounds, such as parathion and tetraethyl pyrophosphate cause a contraction of the pupil of the eye, resulting in impaired vision. Some pilots of dusting airplanes have experienced this reduced vision and had difficulty in landing their airplanes. Consequently, goggles are essential in this operation.

Some materials are caustic to the skin and cause severe skin irritations. Some of these are: lime sulfur solution (winter strength), caustic soda (as used for moss and lichens) and coal tar distillate sprays.

In addition, some super-sensitive persons may exhibit allergic responses to chemicals which are innocuous to most persons.

Part II of this article on Toxicity Hazards will appear in the June issue of AGRICULTURAL CHEMICALS. The concluding portion will continue the discussion of the subject, beginning with "Fire Hazards".

GUEST EDITORIAL

(*Continued from Page 34*)

And now the report of the National Fertilizer Association for 1950 which has just been compiled shows that another new record has been set. In that year the farmers of this nation used more than 18,255,000 tons of commercially produced mixed fertilizer and fertilizer material. This total, representing $750 million in farmer investment, was turned out by an industry of only some 30,000 workers.

The most noteworthy feature of this report is that fertilizer use increased about 11 percent over the preceding year despite the fact that farm income actually dropped. Such a situation had never developed before It upset the long established axiom that when farm income rose, fertilizer expenditures followed; and conversely, that when farm income declined, fertilizer expenditures inevitably had to fall.

In this unprecedented departure from historic principle, there is reason for great satisfaction. For it appears that fertilizer has established itself as essential on the farm, whether the winds of farm economy blow hot or cold. Slowly but surely the farmer is learning that whatever quantities of crops he is called on to produce, and whatever the condition of the market, his best course lies in the use of fertilizer.

But what about supplies for the future? Can the industry continue to provide fertilizer at the same or, more likely, at a greater rate than in the 6-months following the Korean outbreak? Capacity is about three times greater than it was 10 years ago,

but whether adequate amounts will be produced rests largely in the hands of those charged with defense mobilization.

As stated earlier, the prestige of agriculture and its allied industries has dropped sharply in recent days. And with those who are blueprinting our government's plans for the months and years ahead, it appears to have fallen to dismal depths. So far they have failed to recognize the importance of agriculture and of its teammate, the fertilizer industry, to the maintenance of a strong economy and a strong defense. Apparently these men do not feel that agriculture should be given the same consideration as other key industries, such as steel, rubber and petroleum. As a result, the fertilizer industry is not receiving its proportionate share of sulfuric acid and other critical materials.

Without adequate supplies of sulfur and sulfuric acid, the industry cannot manufacture superphosphate, and, consequently, agriculture may have about 15 to 20 percent less superphosphate in 1951 and 1952 despite increased demand. Without enough superphosphate, nitrogen solutions which are in more abundant supply than the solid nitrogen compounds, cannot be effectively utilized. Even though the production of nitrogen for agriculture may exceed last year's production by 15 percent and potash production may be up even more, the simple fact remains that a shortage of sulfuric acid may handicap seriously our farmers' participation in the defense program.

Not all of Washington officialdom is asleep. Aroused by the prospects, the Special Committee on Fertilizer and Farm Machinery of the House Agriculture Committee has held hearings and subsequently has recommended "that the export program be critically reviewed with the objective of finding out how much American sulfur the industries of foreign countries can do without—not how much they would like to have." This is but one of the recommendations which other legislators, both in the House and Senate, have heartily endorsed.

Some basis for optimism seemed to be established when, only recently, four key leaders from agriculture's ranks were appointed to the President's National Advisory Board on Mobilization Policy, headed by Charles E. Wilson, Director of Defense Mobilization.

Whatever course the government takes, whether it be in curtailing sulfur exports substantially, in allocating supplies of sulfur and sulfuric acid, or in taking other steps, it is certain that those in charge of national defense must recognize and act on the elementary fact that agriculture is an essential industry.

Only by accepting this premise can our leaders follow the course which wisdom dictates. Only then can they give our people the hope that the foundations of peace and, if need be, the sinews of war, can be made strong. A strong nation must be well fed. This simple fact must be understood, and action, in accordance with this thought, must be taken.★★

Tagged Fertilizer Report

Vincent Sauchelli, Davison Chemical Corp., Baltimore, chairman of the Fertilizer Industry Committee on Radioactive and Tagged Element Research, has released a general report to contributors to the project. The report reviews the history of contributions and details of field experiments which are proposed for 1951.

The committee has been active since September, 1946, collecting funds and cooperating with state and federal research agencies. The activities were confined to the initiation and support of research projects designed to utilize the radioactive tracer technique in the solution of agronomic problems involving nutrient phosphorus.

According to Dr. F. W. Parker of the Bureau of Plant Industry, Soils and Engineering, the contributions of industry are relatively small at present, but they catalyze the program. The estimated expenditures for this work by various agencies in 1951 will amount to $235,000, of which industry will contribute $16,000.

A summary of radioactive phosphorus field experiments for 1951, which will cover 29 states and Canada, will include 114 field experiments on some 23 crops.

1. The New Hampshire Agricultural Experiment Station will conduct experiments on a comparison of the relative absorption of phosphorus by apple trees and fruits from foliar sprays, and from soil applications of fertilizer, using radioactive phosphorus as a tracer.

2. The Maine Agricultural Experimemnt Station will conduct experiments on factors affecting the use of fertilizer and soil phosphorus by oats, potatoes and blueberries.

3. The Virginia Agricultural Experiment Station will conduct experiments on the utilization of fertilizer phosphorus applied as a top dressing on permanent pastures and meadows.

4. The North Carolina Agricultural Experiment Station will conduct experiments on the utilization of calcium by crops from the calcium phosphate, sulfate and carbonate contained in the mixed fertilizer.

5. The Michigan Agricultural Experiment Station will conduct a study of the utilization of phosphorus from granulated and non-granulated phosphatic fertilizers by several crops grown on some Michigan soils.

6. The Utah Agricultural Experiment Station will conduct tests on the influence of moisture on the availability and utilization of phosphorus.

7. The Georgia Agricultural Experiment Station will work in support of equipment development for the use of radioactive fertilizers.

BULLETINS

(Continued from Page 85)

feature of the arrangement is that the bucket can be removed and replaced with lift forks in a few minutes, thus converting the equipment into a means for handling materials other than in bulk. The bucket itself has a 9 cu. ft. capacity with ability to clean-up along walls and into corners. Complete literature is available from the makers.

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Gunnison to Signode

Herbert F. Gunnison, Anchorage, Kentucky, has been appointed sales representative in the Louisville area by Signode Steel Strapping Co., Chicago.

Classified Advertising

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

Positions Open

Agronomist or Plant Physiologist: Established, growing manufacturer of agricultural chemicals in South needs man to evaluate weed killers, defoliants, work with sales department and with experiment stations. Experiment station experience highly desirable. Give age, education, experience, personal data, photograph, salary expected. Address Box No. 524, c/o *Agricultural Chemicals.*

Entomologist: Manufacturer of insecticides and wood preservatives in South wants man to contact customers and experiment stations on product application work and to evaluate new products experimentally, also work with sales department. Give education, experience, personal information, photo and salary expected. Address Box No. 525, c/o *Agricultural Chemicals.*

Two Salesmen with agricultural background for sale of complete, top-quality line of insecticides, fungicides and herbicides to distributors—one for New England to Pennsylvania; one for Virginia, the Carolinas and Georgia. Straight salary and travelling expense. Travel about half of time. Write, giving full particulars of sales experience, territory covered and education. Your letter will be held in strict confidence. Address Box No. 526, c/o *Agricultural Chemicals.*

"Self-Starting" Entomologist for growing subsidiary of reputable national manufacturer. Experienced, well rounded, individual who can advise management, assist salesmen through field-trip work, conduct technical development on new—old products. Unique position is that no other personnel is now so employed. Position has challenge and independence of small business with big-business security. Location in the East. All replies confidential. Address Box No. 527, c/o *Agricultural Chemicals.*

Positions Wanted:

Agricultural Sales or Service: Currently employed chemist, 29, married, no children, draft exempt, desires to work with people rather than things. Personality and appearance suitable to sales work. B. S. in Agricultural Chemistry (University of Toronto). M. S. in Agricultural Biochemistry (Michigan State College). Strong general agriculture background. Teaching experience. Three years chemical research experience with fungicides and insecticides. Familiar with the latest agricultural pesticides. Location immaterial. Address Box No. 529, care of *Agricultural Chemicals.*

Chemist:—Desires new connection preferably with manufacturer in technical sales or associated work. Fifteen years of experience in emulsions, surfactants, soaps. Can set-up laboratory for research or plant control and direct work. For full details, write to Box No. 528, care of *Agricultural Chemicals.*

Young Man (28) wants job in agricultural chemicals or allied field in sales, extension, or research. Prefer Southeast. M.S. 1950, training includes pathology, agronomy, and chemistry. 1½ years experience in independent research on citrus diseases. Address Box 484, Kendall, Florida.

Sales Representative—Desires new position with manufacturer of agricultural chemicals. At present employed. Has covered East Central states and knows the formulators and others in trade well. Five years in present sales job with manufacturer of basic fungicide and insecticide materials. Graduate chemist. Married. Prefer eastern location but will go anywhere. For further details, write Box No. 530, c/o *Agricultural Chemicals.*

Miscellaneous:

Wanted—used ribbon blender, ¼, ½ or 1 ton capacity, address all offers to Box No. 531, c/o *Agricultural Chemicals.*

Will buy—Manufacturer will purchase established products or in the development stage sold in the agriculutral chemical field. Or will purchase outright going company of such products. Buyer is financed substantially for capital expansion. Sound going firm with products of merit only considered. Send information in full confidence, through your attorney if you prefer. Address Box No. 532, c/o *Agricultural Chemicals.*

For Sales — Sprout Waldron insecticide blending system, almost new. Immediate shipment. Address Box No. 533, c/o *Agricultural Chemicals.*

For Sale: Seven 27,400 gallon tanks 10½ feet in diameter and 41 feet long, suitable for storing petroleum or chemicals, also a number of 6,000 gallon tanks 5 feet in diameter and 41'6" long, suitable for storing chemicals or nitrate solutions. Shell thickness on all 3/8"—head thickness ½". If interested, write P.O. Box 137, or phone 35-1681 Memphis, Tennessee.

Advertisers' Index

(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

Tale Ends . . .

DR. George C. Decker's sparkling replies to cross examination at the Select Committee Hearing on May 2 lent a considerable amount of spice to the otherwise august atmosphere. Congressman Hedrick, (W. Va.) questioned whether or not the witness believed the increased use of insecticides during the past several years bore any relationship to the corresponding rise in the cancer rate . . . particularly cancer of the lungs.

Without hesitation, the Illinois entomologist replied that it could be, of course, but other factors could also be cited. The increased numbers of autos and busses have filled the air with carbon monoxide which everybody breathes, he said, and continued that cancer has also increased since the repeal of prohibition. "Maybe it's alcohol that is causing the trouble", he ventured. The scientist then went on to point out the extreme improbability of insecticides causing any such menace, and emphasized the myriad factors involved in finding out the true answer.

At another juncture, during Mr. Kleinfeld's cross-examination, Congressman Horan asked if he might interrupt and ask a question. Dr. Decker replied it was all right . . . if "eager beaver Kleinfeld" didn't mind.

It should not be gathered, however, that all of the Decker replies were of such flippant air. His answers were sound, factual and specific. He managed to phrase his statements without generalities, a feat which should add some good meat to the already well-stocked record of the hearing.

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After noting numerous mispronunciations of the name of their product, dieldrin, Hyman & Co., have published in their March *Newsletter*, a few instructions on how to say the word correctly. The first syllable of "dieldrin" is derived from the surname of the 1950 Nobel Prize winner in chemistry, Otto Diels, the note advises. His name is pronounced as though it was spelled *Deels*, therefore, the word "dieldrin" should be said as though it were spelled "deeldrin", the paper concludes.

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Dr. Laake, well-known entomologist at the Kerrville, Tex., experiment station may shortly join the Point 4 Program in Central and South America, but USDA says there is no definite word as yet on such an appointment.

Below: President Ernie Hart presents winners award in feature race at the Miami Kennel Club, programmed to honor visitors from the NAC convention party. With Ernie are Harold True, Rohm & Haas, a member of the local Miami arrangements committee and Dr. Jack Bellows, Hector Supply Co., Miami. Also pictured are the winning greyhound and his trainer.

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TOMATOES
- Flea beetle
- Colorado potato beetle
- Blister beetle
- Fruit worm

POTATOES
- Colorado potato beetle
- Blister beetle
- Flea beetle
- Potato leaf hopper

BEETS
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